

TECHNOLOGY DEPT

A PICTORIAL SURVEY OF CURRENT PRACTICE, EQUIPMENT AND MATERIALS

Construction Methods

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DETROIT

AUGUST

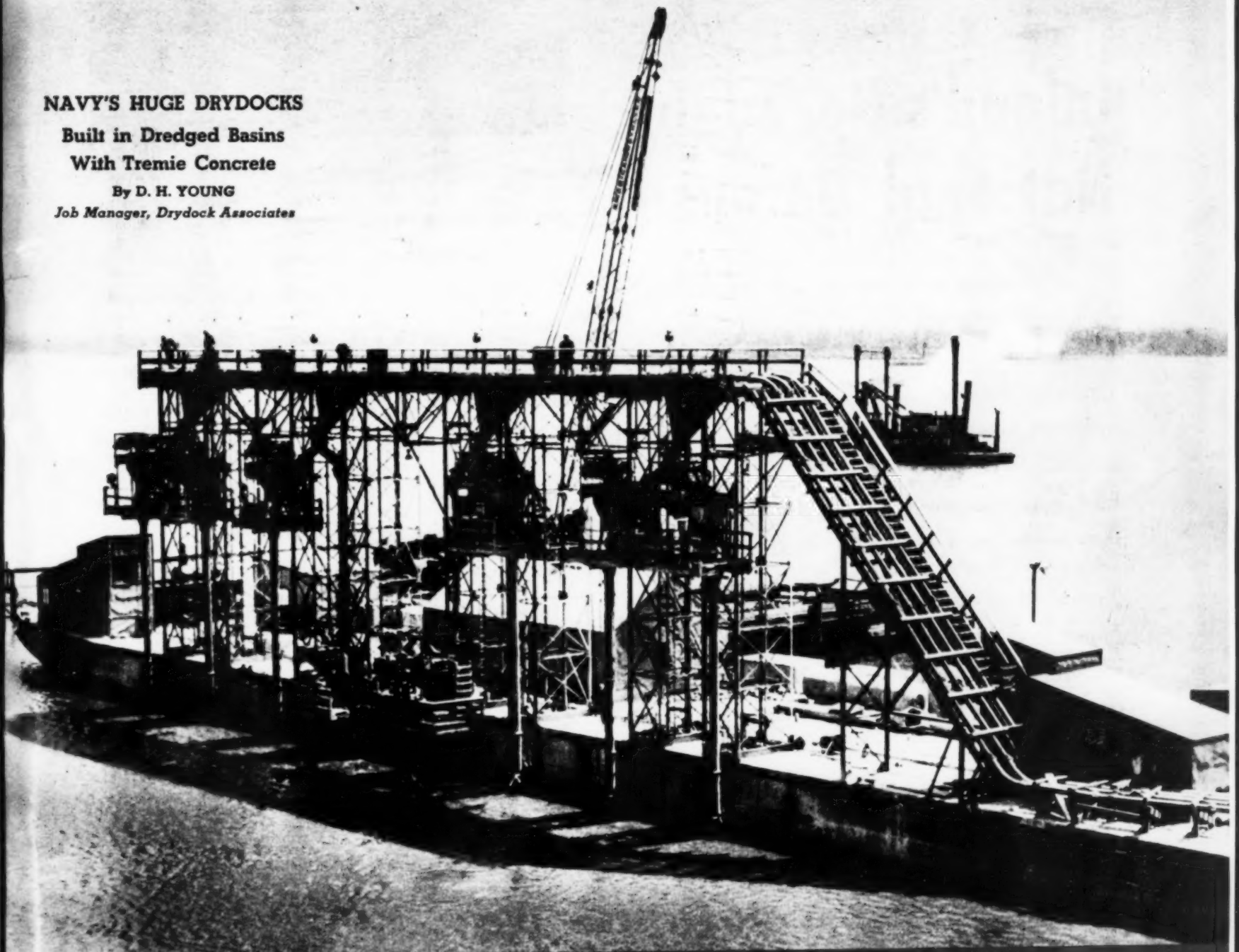
1941

NAVY'S HUGE DRYDOCKS

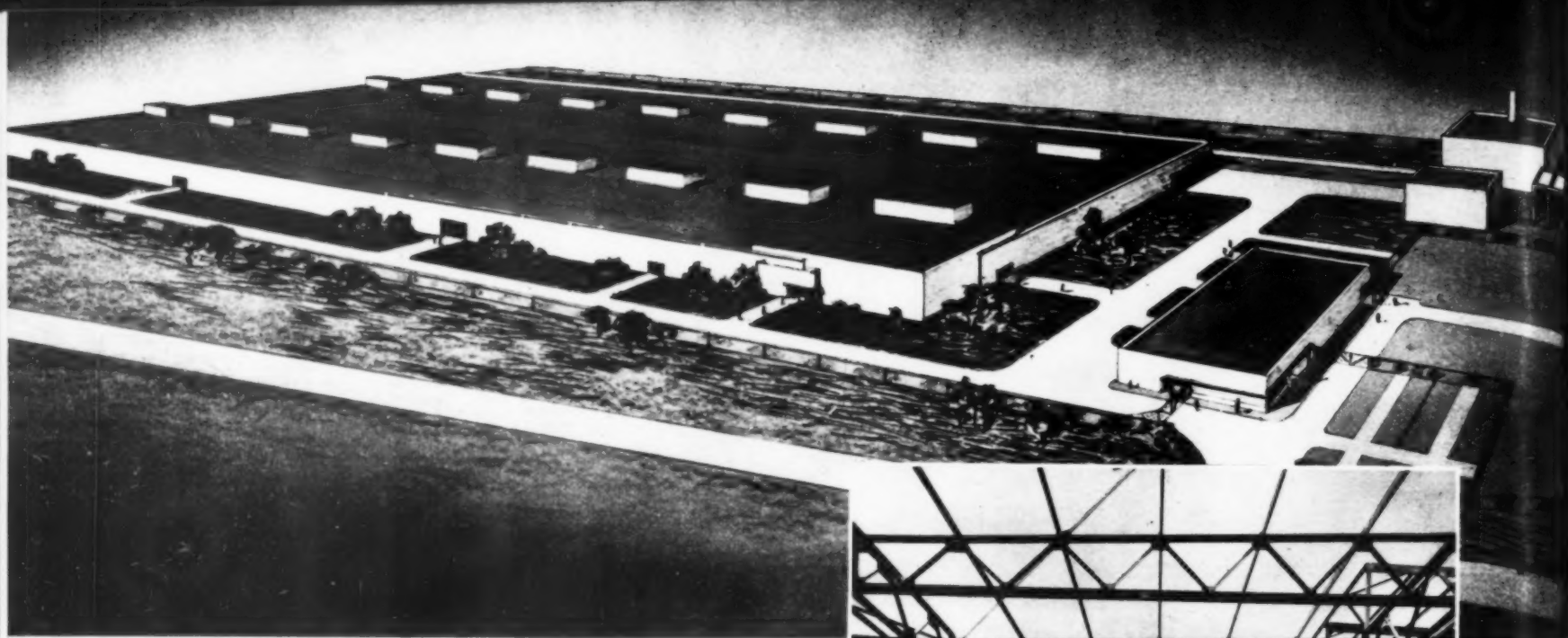
Built in Dredged Basins
With Tremie Concrete

By D. H. YOUNG

Job Manager, Drydock Associates



10-Acre Aircraft Building ★ Wellpoints Drain Camp Site and Drydock Area
Concrete "Igloos" for Ammunition Storage ★ Steel Pipes for Column Forms



This new Studebaker plant will have 600,000 sq. ft. of floor space, and when operating at capacity its four thousand workers will be turning out parts for production of two engines per hour. It is one of three Studebaker Defense plants now nearing completion.

Inland's No. 1 Job: National Defense

IN common with the vast majority of American industry, every phase of Inland's business is geared to one great purpose—National Defense. It is our No. 1 job! Our mills are making new production records; our schedules are being constantly made and re-made so that the steel for our Country's Defense may be delivered when and where needed.

Typical of this is the new Studebaker Airplane Motor Part Plant illustrated above. Late one evening Studebaker officials notified Inland that this plant was to be built and that time was



the important factor. Inland's help was needed along with others. The orders reached us January 28, 1941. Schedules were revamped, deliveries began February 7 and were completed February 27. This is what Inland is doing daily to aid in the great program in which our nation is engaged.

However, we also have a No. 2 job. Defense comes first; after that, all our efforts are directed toward an equitable distribution of our remaining production so that we may, to the best of our ability, serve the many friends whose business has been responsible for the development and growth of our company.

SHEETS • STRIP • TIN PLATE • BARS • PLATES • FLOOR PLATE • STRUCTURALS • PILING
RAILS • TRACK ACCESSORIES • REINFORCING BARS

TECHNOLOGY DEPT.

INLAND STEEL CO.

38 S. Dearborn Street, Chicago • Sales Offices: Milwaukee, Detroit, St. Paul, St. Louis, Kansas City, Cincinnati, New York

CURRENT JOBS

.... and Who's Doing Them

BUILDINGS

Public—In Chattanooga, Tenn., **Stone & Webster Engineering Corp.**, of Boston, Mass., will build plant for manufacture of TNT for War Department, at cost of \$39,000,000. Successful bidders for ammunition plant contract in St. Louis, Mo., were **Fruco Construction Co.**, **Fruin Colnon Contracting Co.**, of St. Louis, and **Massman Construction Co.**, of Kansas City, at estimated cost of \$33,999,599. **Ford, Bacon & Davis**, of New York City, received contract to erect fuse and detonator plant in Jacksonville, Ark., for approximately \$33,500,000. Low bidder for shell loading plant contract in Minden, La., was **Silas Mason Co., Inc.**, of New York City, with bid of \$30,000,000. **E. I. DuPont de Nemours & Co.**, of Wilmington, Del., was awarded contract to construct and operate plant for manufacture of TNT, DNT and tetryl, in Sylacauga, Ala., for \$24,675,000. **Stone & Webster Engineering Corp.**, of New York City, will build for Sperry Gyroscope Co., Inc., in North Hempstead, N. Y., 1-story factory and 3-story administration building at total estimated cost of \$20,281,001, to be financed by Defense Plant Corp. War Department contract went to **E. I. DuPont de Nemours & Co.**, of Wilmington, Del., to design and construct expansion to Ordnance Works in Morgantown, W. Va., at price of \$15,848,000.

Austin Co., of St. Louis, Mo., was awarded contract to construct buildings for manufacturing airplane gun turrets, etc., in St. Louis County, Mo., at estimated cost of \$10,000,000; War Department will finance. At Wolf Creek Ordnance Plant and Milan Storage Depot in Milan, Tenn., construction of ammunition storage depot, magazines, shelters, buildings and utilities is under way by **H. K. Ferguson Co.**, of Cleveland, Ohio, and **Oman Construction Co.**, of Nashville, for \$10,791,950. Fort Greene houses in Brooklyn, N. Y., will be built by **D-M-W Contracting Co.**, local contractor, at cost of \$9,437,000. Contract for ordnance plant expansion in Union Center, Ind., went to **Bates & Rogers Construction Co.**, of Chicago, Ill., for \$8,977,000, including equipment.

HEAVY CONSTRUCTION

Successful bidders for Santa Fe dam contract in Los Angeles, Calif., were **Morrison-Knudsen Co.**, **J. F. Shea Co., Inc.**, and **Ford J. Twaits & Winston Bros.**, local contractors, with bid of \$8,837,199. Contract for spillway excavation for Clearwater dam in Piedmont, Mo., went to **Mittry Bros. Construction Co.**, of Los Angeles, Calif., for \$2,790,081. In Wellston, Ga., air depot is under repair by **Mion Construction Co., Inc.**, **W. C. Shepherd Construction Co.** and **Griffin Construction Co., Inc.**, of Atlanta, for \$15,000,000. **Chas. M. Dunning Construction Co.**, **Guy H. James Construction Co.**, of Oklahoma City, Okla., and **Patterson Steel Co.**, of Tulsa, were awarded contract to build permanent buildings at air corps depot in Oklahoma City, Okla., with bid of \$14,036,215. War Department contract for technical air school in Biloxi, Miss., went to **Newton & Glenn, J. A. Jones Construction Co.** and **Knoct Construction Co.**, of Hattiesburg and Pass Christian, for approximately \$12,000,000 on cost-plus-fixed-fee basis.

At Hope, Ark., **W. E. Callahan Construction Co.**, of Dallas, Tex., is engaged in the construction of proving ground for War Department at cost of \$7,056,933. Flying school in Midland, Tex., is under way by **F. M. Reeves & Son** and **Cage Bros.**, of Bishop, for \$5,360,000. Another contract for flying school in Lubbock, Tex., was awarded to **Holland Page, Geo. Kies, Inc.**, and **L. H. Lacy**, of Austin, at total cost of \$4,675,000. Training station at Harlingen, Tex., is under construction by **H. B. Zachry**, of San Antonio, and **J. E. Morgan & Son**, of Waco, to cost \$4,338,000. **Ford J. Twaits Co.**, of Los Angeles, bid in for airport improvements contract in Victorville, Calif., for \$2,126,100.

HIGHWAYS AND BRIDGES

Among recent highway contract awards are the following: Alabama: \$404,596 to **Saunders & Perkins**, of Hinesville, Ga. California: \$345,675 to **Frederickson & Westbrook**, of Sacramento. Florida: \$923,000 to **L. B. McLeod Construction Co.**, of Orlando, and **H. E. Wolf Construction Co.**, of St. Augustine. Louisiana: \$535,437 to **Central Construction Co.**, of Monroe. Minnesota: \$283,190 to **Nelson & Hafner**, of Duluth, and **Lundin Bros.**, of Mankato; \$270,957 to **Western Contracting Co.**, of Sioux City, Ia. New York: \$938,392 to **Geo. J. Atwell Foundation Corp.**, of New York City. Oklahoma: \$360,130 to **J. W. Mootman**, of Clinton. Ohio: \$347,493 to **W. H. Ringwold & Sons** and **Purdy & Herring**, of Mansfield; \$461,006 to **W. P. McCarren**, of Walhonding. Oregon: \$313,317 to **F. Penepacker**, of Portland. Pennsylvania: \$668,979 to **C. W. Good**, of Lancaster; \$529,365 to **Adam Eidemiller**, of Greensburg. South Dakota: \$233,599 to **C. A. Wagner Construction Co.**, of Sioux Falls. Texas: \$781,508 to **Brown & Root, Inc.**, of Corpus Christi. Washington: \$384,200 to **Goetz and Brennan**, of Seattle.

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AUGUST, 1941

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Construction Methods

A Pictorial Survey of Current Practice, Equipment and Materials

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PUBLICATION

The **HOW** of it

For the benefit of readers concerned with the practical application of method or equipment the following references are to articles or illustrations in this issue that tell:

- How **CONCRETE IGLOOS** for ammunition storage were built with bolted steel plate forms. —p. 39
- How **EIGHT ADJUSTABLE TREMIES** on floating plant concreted floor of drydock. —p. 42
- How **FLOATING EQUIPMENT** was coordinated for underwater operations in drydock construction. —p. 43
- How **FOUR PIPE LINES** delivered pumped concrete from mixing plant to tremie barge. —p. 45
- How **SMALL MODEL** to test new tremie method showed spreading action of concrete. —p. 46
- How **TRUSS BOX FORM** for drydock floor slab was handled by floating equipment. —p. 47
- How **AIR COMPRESSOR** maintained pressure in contractor's water supply tank. —p. 48
- How **PIPE TAPPING MACHINE** made service connection to water main. —p. 50
- How **STEEL PIPE FORMS** for tall columns were made self-supporting by tower bracing. —p. 52
- How **JACOB'S LADDERS** supported scaffold planks used by bridge painters. —p. 54
- How **BIT SORTER** classified detachable bits according to length before sharpening. —p. 55
- How **HEAVY REINFORCING BARS** were locked in position for welding. —p. 55
- How **WIRE MESH TRACKS** provided runway for concrete mixer trucks in sand soil. —p. 56
- How **ELECTRIC DRILL** equipped with special socket operated winch on A-frame derrick. —p. 58
- How **CAUSTIC SODA SOLUTION** neutralized aluminum paint spots prior to placement of cement floor topping. —p. 59
- How **1,500 WELL POINTS** predrained excavation for large drydock. —p. 62
- How **ROTARY DRILL** and fishtail jetting bit put down holes for well points. —p. 63
- How **PORTABLE DRILL RIG** put down holes and set vertical H-beams for driving. —p. 64
- How **HORIZONTAL BOOM** on special crane speeded erection of precast concrete houses. —p. 65

THE JOB JESTER

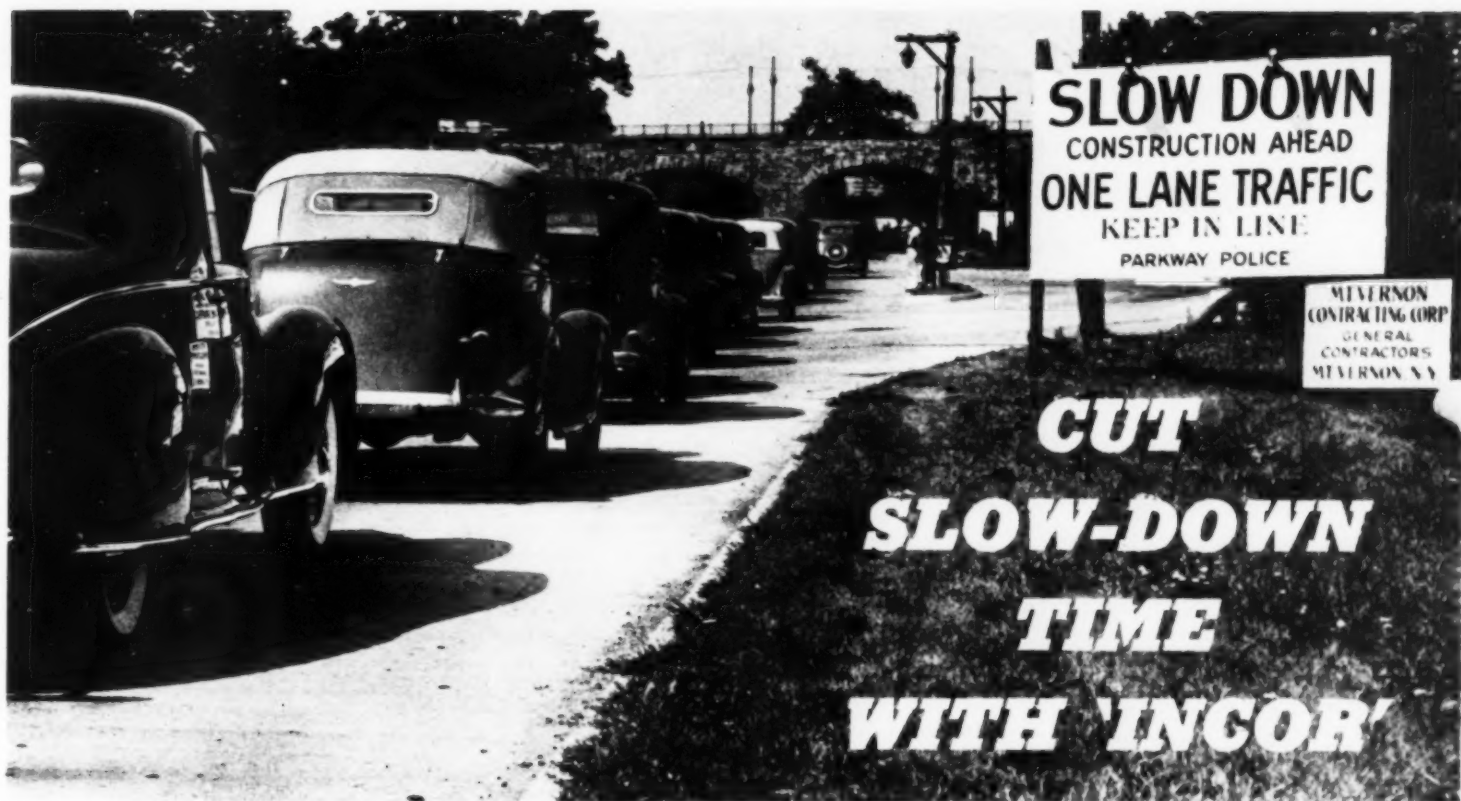
CARTOONS DRAWN FOR CONSTRUCTION METHODS



Joe, we're higher than I thought—look!"



"Sunday driving was so risky till I started going with you, Horace."



'INCOR' SPEEDS NEW YORK PARKWAY WIDENING



ONE after another, highway bottlenecks are being eliminated. Traffic congestion at one of the busiest spots in Westchester County's parkway system was relieved by widening Saw Mill River Parkway from 4 lanes to 6, with center dividing strip, a distance of 2 miles from terminus of Henry Hudson Parkway to Cross County Parkway.

Good job planning included the use of 18,000 bbl. of Lone Star Cement in the major part of the work, with 1,000 bbl. of 'Incor' for closing out paving, access lanes, gas-station approaches, and gaps left open for drainage work. 'Incor' concrete placed one day, ready for use the next—"Slow Down" signs came down days sooner!

Use 'Incor'* to speed national defense—eliminate bottlenecks in highway, bridge and plant construction. Write for copy of "Cutting Concrete Costs." Lone Star Cement Corporation, Room 2262, 342 Madison Avenue, New York.

*Reg. U. S. Pat. Off.



QUALITY PAYS...
INSIST ON LONE STAR
AND 'INCOR'

Saw Mill River Parkway widening. Under Triborough Bridge Authority . . . General Contractor: Mt. Vernon Contracting Corp., Mt. Vernon, N. Y. . . . Consulting Engineer: Gilmore D. Clarke, New York City.

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Offices: ALBANY • BIRMINGHAM • BOSTON • CHICAGO • DALLAS • HOUSTON • INDIANAPOLIS • KANSAS CITY • NEW ORLEANS • NEW YORK • NORFOLK • PHILADELPHIA • ST. LOUIS • WASHINGTON, D. C.



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OSGOOD Model 800 Mobilcrane equipped for loading logs in a selective logging operation in Washington. Selective logging requires frequent and long movements of loading and hauling equipment. The Mobilcrane is ideally suited for such work and for service in any large Industrial, Shipbuilding and Material Yard.

THE MOBILCRANE—

the newest thing in mobile, ONE ENGINE—ONE-MAN-CONTROLLED, cranes, for all kinds of efficient material handling. Air control of hoist, swing and travel, air brakes and hydraulic steering make this Model 800, 20 ton crane as easy to handle as a truck.

Write for latest information on OSGOOD air-control Mobilcranes.

The
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Sizes: 3, 5, 10, 15, 25, 35
DIESEL - GAS - ELECTRIC

Associated with
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HERCULES
IRONEROLLERS
6 to 12 Tons
Diesel or Gasoline

Associated with
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OSGOOD

Sizes:

1/2 to 2 1/2 Cu. Yd.

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SHOVELS

DRAGLINES - CRANES

Crawler & Wheel Mounted

45,000 CU. YDS. PER DAY!



MARSCH-PETERSON- WALKER-CONDON

Use 38 Bottom-Dump EUCLIDS For Kanopolis Dam

Seventeen million cubic yards or 90% of all the excavation for this huge flood control project is being hauled by Bottom-Dump EUCLIDS. Working with their usual speed and economy, 38 Euclids average over 45,000 cu. yds. each 16-hr. day on operations such as these:

Hauling an impervious mix from a special elevating grader with a 12-ft. vertical blade, eleven Model "F" 14-18 yard Euclids average about 870 loads per day on 6000 ft. haul . . . Seven Model "F" Euclids of same size working under 48" elevating grader average about 700 loads of sandy clay per day on 3500 ft. haul to dyke . . . Hauling sand from two 3-yd. and 3½-yd. shovels, eighteen Model "L" 24-30 yard Euclids average about 870 loads per day on 10,000 ft. haul.

Why not visit Kanopolis Dam and see Bottom-Dump EUCLIDS prove again that they are unequalled for such gigantic tasks.

The EUCLID ROAD MACHINERY Co.
CLEVELAND, OHIO



EUCLID

SELF-POWERED
EARTH • ROCK • COAL • ORE
HAULING EQUIPMENT

And — CRAWLER WAGONS • ROTARY SCRAPERS • TAMPING ROLLERS



For ROADS AND LOADS



Power shovels that GO under their own POWER

Not so long ago power shovels were figured only in terms of how much they could move and how quickly they could move it. Now, thanks to recent modern manufacturing advances, these are not the only important measures of merit . . . There's the additional, important factor of *how quickly* and *how far* the shovels themselves can go under their own power! You'll be seeing more and more shovels and cranes, mounted on extra heavy 6-wheel chassis with Timken Front and Timken Tandem Drive Rear Axle Units,



speeding over the highways—saving time between jobs, making more money for their owners. Timken builds the husky "6-Wheelers" especially suited to the roads and the loads encountered in power shovel duty. And you will be wise to investigate shovels or cranes on Timken "6-Wheelers" before you make your next purchase.

★ TIMKEN AXLES ★

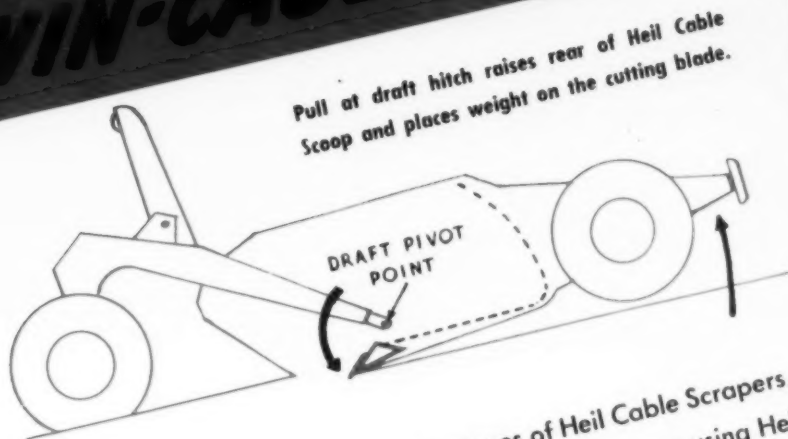
THE TIMKEN-DETROIT AXLE COMPANY, DETROIT, MICHIGAN • WISCONSIN AXLE DIVISION, OSHKOSH, WISCONSIN

You get capacity payloads IN HARD-PACKED SOIL WITH HEIL TWIN-CABLE SCOOPS!

DOWN PRESSURE ON CUTTING BLADE INSURES BETTER SOIL PENETRATION.

Heil Cable Controlled Scrapers are designed and built to give you fast digging of capacity loads, without scarifying, in hard compact soils. The Draft Pivot Point is located above and back of the cutting blade as shown on the accompanying illustration. Pull at the draft hitch forces the blade down into the ground, often raising the rear wheels off the ground, and places the weight of the scraper on the cutting bit. The plow-like cutting blade digs into the ground quickly and rolls big loads into the bowl with ease.

HEAVING LOADS IN TOUGH DIGGING



Pull at draft hitch raises rear of Heil Cable Scoop and places weight on the cutting blade.

Benefit by the EXTRA digging advantages of Heil Cable Scrapers. Experienced contractors from Maine to California are using Heil Road Machinery to make the TOUGH jobs PROFITABLE ones. Equip yourself for profits with Heil Dig-N-Carry Scoops, Bulldozers, Trailbuilders, and Hydraulic Dump Units . . . Send today for FREE catalog.

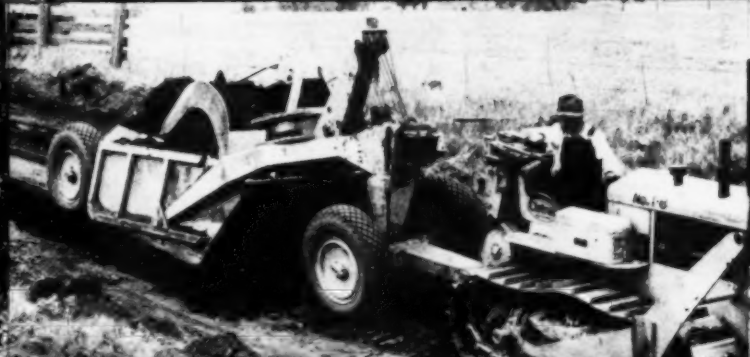


THE HEIL CO.

MILWAUKEE, WISCONSIN • HILLSIDE, NEW JERSEY



Heil Trailbuilder and Model DDH Cletrac operating near Denver, Colorado.



Six-Yard Heil Twin Cable Scoop and Model DDH Cletrac on a Railroad Construction Job near Anoka, Minn.



Eight-Yard Heil Dump Body and Heil Telescop Hoist for dependable service.

Mighty Good News!

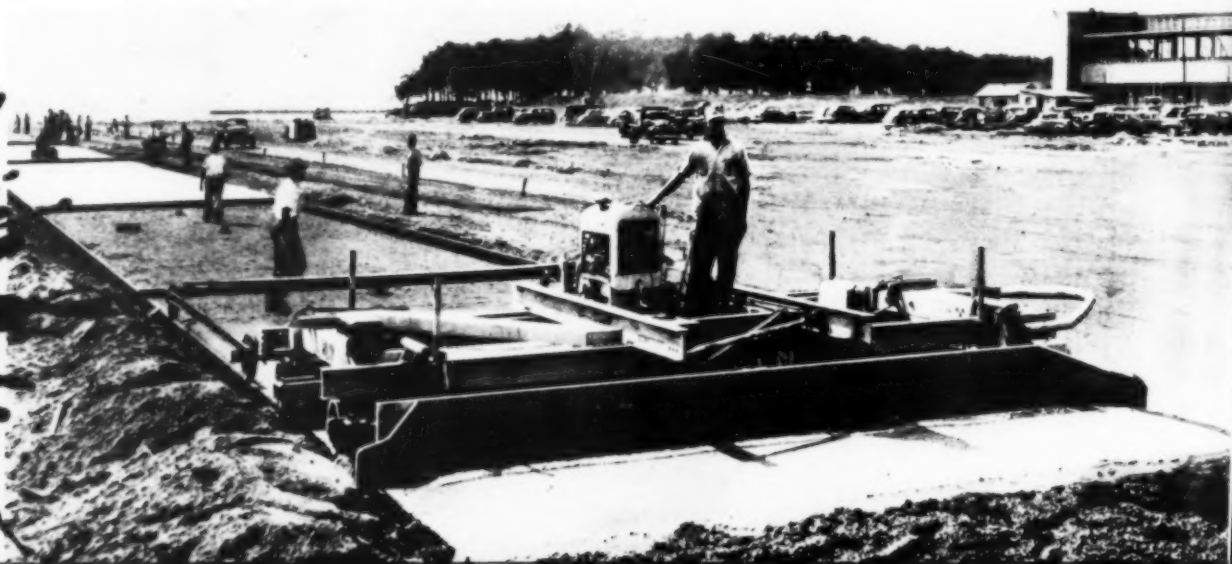
For Builders of Airports and Roads

Contractors will now be able to utilize the maximum production of their biggest pavers. With the new MODEL XB BLAW-KNOX FINISHING MACHINE it is now possible to pave at top speed—with superior quality finish of slab.

This new model finishing machine has greater flexibility of design and operation to handle low slump concrete and better meet variable field conditions.

GOOD NEWS INDEED for defense contractors who must pave in a hurry. New Blaw-Knox Finishing Machines and Concrete Spreaders are hard at work on various defense projects, a few of which are: the Boise (Idaho) Airport; Wendover Airport (Utah); Gunter Field (Ala.); Jefferson Proving Ground (Ind.); Glenn L. Martin Aircraft Plant (Md.); Yakutat Airport (Alaska); Sunset Airport (Wash.); Trans-Isthmian Highway (Panama); Kingsbury Ordnance Plant (Ind.); Vultee Aircraft Plant (Tenn.); Naval Air Base (Fla.); Mobile (Ala.) Airport; Hamilton Field (Cal.) Airport; Scott Field, (Ill.)

PAVE
AT
TOP SPEED



USE THE BLAW-KNOX TRANSVERSE BLADE CONCRETE SPREADER WITH THE NEW MODEL XB FINISHER FOR MAXIMUM YARDAGE AT LOWEST COST



Paving contractors like BLAW-KNOX AUTOMATIC TRANSVERSE BLADE CONCRETE SPREADERS. That's why four times as many Blaw-Knox Spreaders have been sold as all other makes combined, since they were introduced and put into service early last year.

SPREAD CONCRETE MECHANICALLY: — Blaw-Knox CONCRETE SPREADERS, equipped with an automatic transverse spreading blade, easily handle the top output of any paver . . . will spread concrete without segregation . . . will spread concrete as dry as $\frac{1}{2}$ inch slump . . . will spread concrete without disturbing road form alignment . . .

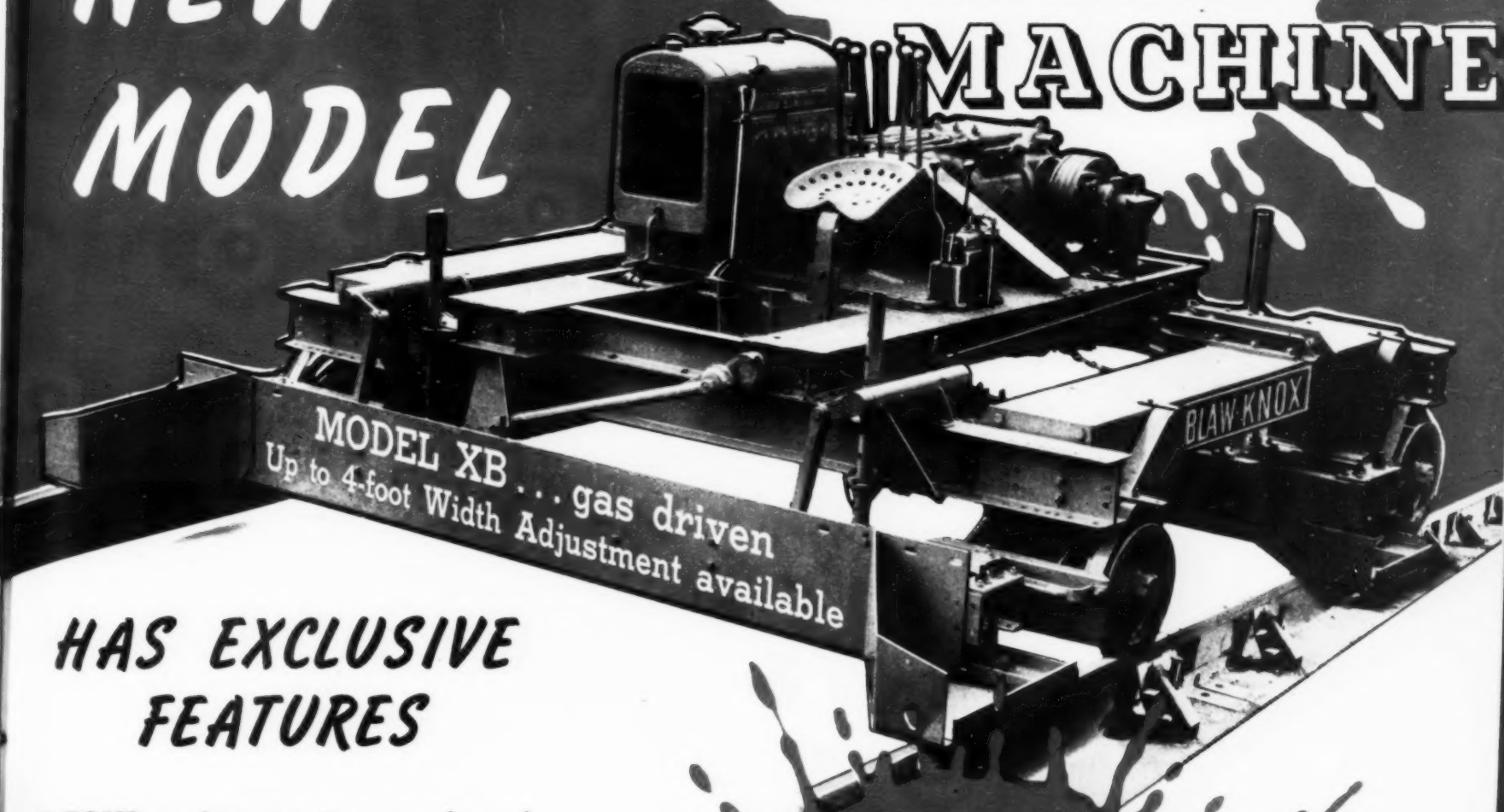
Dump concrete anywhere on the subgrade and the spreader does the rest — the spreading blade action is automatic.

Blaw-Knox Concrete Spreaders can be changed from narrow (single lane) to full width or vice versa by purchase of change parts. This cannot be done with any other concrete spreader.

BLAW-KNOX

...THE
NEW
MODEL

Blaw-Knox FINISHING MACHINE



HAS EXCLUSIVE FEATURES

- FOUR working traction speeds, and TWO travel speeds—SIX speeds forward and reverse.
- FOUR screed speeds.
- UNIT AUTOMOTIVE TRANSMISSION drives traction, screeds, belter, and tamper or vibrator.
- SPECIAL WHEEL EQUIPMENT for multiple lane construction of airport runways and aprons.
- REMOVABLE WHEEL RIMS for quick wheel change.
- STRONGEST structural frame of any finishing machine ever built. One piece cross members—no splices. Design provides better weight distribution with elimination of 1000 lbs. excess weight—easier on the forms.
- WIDEST screed ends—keeps concrete between forms.
- FOOT PEDAL STEERING and braking.

5 YEAR
GUARANTEE

ON
STRUCTURAL FRAMES
AND
WHEEL AXLES

Other features of the new
MODEL XB BLAW-KNOX FINISHING MACHINE
include:

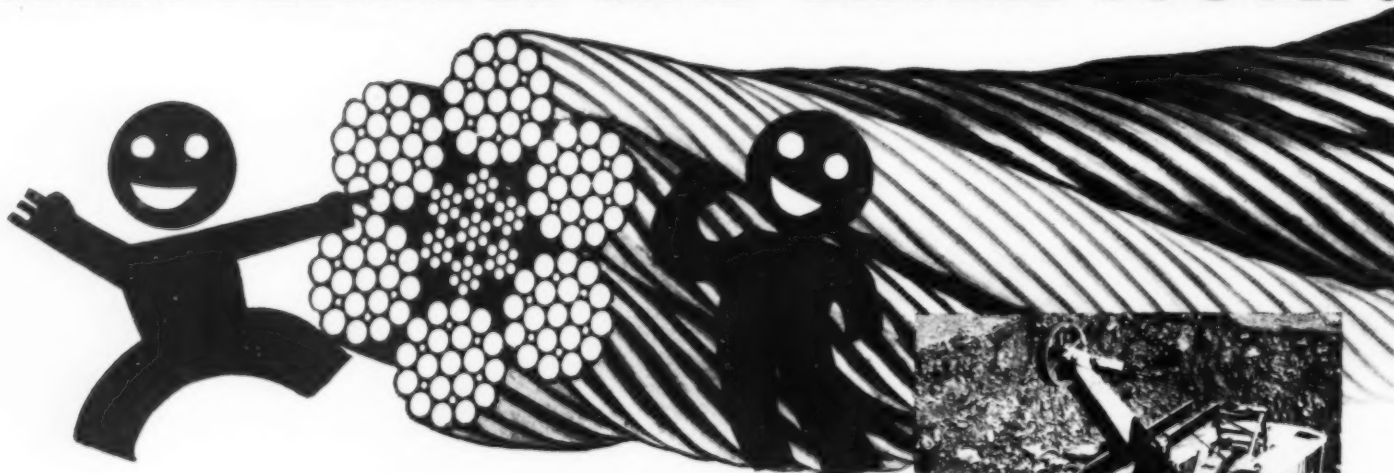
- Self-aligning ball bearings for screed drive.
- Accurate quick adjustable front screed for rapid crown change.
- Fast power operated hydraulic screed lift.
- Efficient wheel cleaners.
- Quick and convenient transportation wheels.

BLAW-KNOX DIVISION of Blaw-Knox Co.

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OF WIRE MAKE MONARCH PREFORMED EXTRA FLEXIBLE AND EXTRA TOUGH!



INNER WIRES ARE EXTREMELY FLEXIBLE. They're drawn in a special way to make them extra strong, extra pliable. They're improved plow steel too. They bend easily over your sheaves and drums. These wires are the reserve strength of Monarch Whyte Strand PREformed.

OUTER WIRES ARE EXTRA TOUGH. These wires are improved plow steel, specially drawn for outside service. They're made **LARGER** to provide more surface for better abrasion resistance. They are Monarch Whyte Strand PREformed's "first line of defense"... that's why we give them a **TOUGH** abrasion resisting skin.

And then to provide for EXTRA long life, every wire in a Monarch Whyte Strand is thoroughly covered with a special lubricant which protects unseen, inside surfaces against corrosion and friction. This better wire rope is available from stock in the correct size, grade and construction.

Your equipment may be similar to hundreds of others. Take advantage of the experiences of others having equipment like yours—ask for a Macwhyte recommendation of the rope that has proved itself to be the best for your equipment.

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The correct ropes for your equipment

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Wheel Bearing Lube that Stays *on* the Rollers and *off* the Brakes!



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IT CLINGS

AFTER
34,000
MILES, TOO!

IT DIDN'T
LEAK OUT

IT'S GOOD
SUMMER
AND WINTER

IN THESE DAYS of National Emergency, with extra-heavy loads and practically continuous service, your wheel bearings need a lubricant that stays in bearings and off brakes.

Realizing that ordinary wheel-bearing lubricants cannot meet present-day needs, operators of heavy-duty vehicles are changing over to **TEXACO MARFAK-HEAVY DUTY**.

TEXACO MARFAK-HEAVY DUTY is made especially for wheel bearings. Under the severest road tests nationally prominent fleet operators have found Marfak-Heavy Duty so good in summer and winter that changing grades for purely seasonal reasons is no longer necessary.

The outstanding performance that has made Texaco preferred in the fields listed in the panel has also made it preferred on many of the larger construction jobs everywhere.

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★ More revenue airline miles in the U. S. are flown with Texaco than with any other brand.

★ More buses, more bus lines and more bus-miles are lubricated with Texaco than with any other brand.

★ More stationary Diesel horsepower in the U. S. is lubricated with Texaco than with any other brand.

★ More Diesel horsepower on streamlined trains in the U. S. is lubricated with Texaco than with all other brands combined.

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TEXACO Lubricants and Fuels

FOR ALL CONTRACTORS' EQUIPMENT

ECONOMIZE... OR AGONIZE



ALTER EGO: Literally, "one's other self"—the still, small voice that questions, inspires, and corrects our conscious action

Sure arc welding is a cost-cutter but that's not the rub, we just haven't time to think about changing over now.

ALTER EGO: Why *think* about it? *Do it!*

Whoa! What's the hurry?

ALTER EGO: Hurry? Glance around you! See how others are hurrying over fast. If we wait until the business slump gives us time, it will be time out, for all time. It's *economize* right now with welding ... or *agonize* right after.

All right then, how do I start?

• •

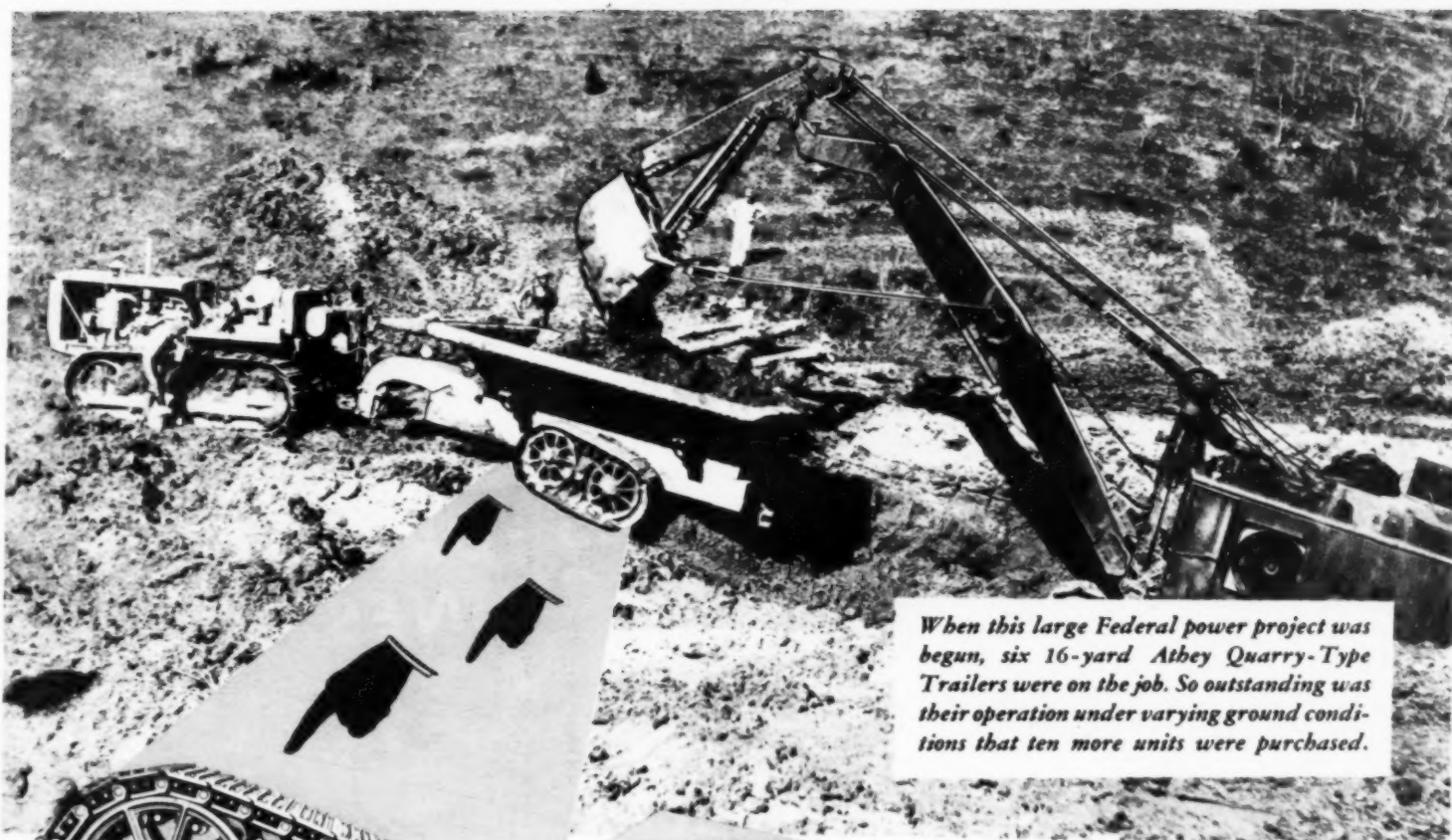
LINCOLN SUGGESTS: Get the "feel" of welding, first on simple designs. Then advance until you get the full benefits of welding—cut steel tonnage 10% to 20%—eliminate detailing and punching—get *faster* erection with rigid, large, easily-handled shop-fabricated sections. One large builder now uses welding for 90% of his work. Learn from the experience of others. May we send you Structural Studies regularly?

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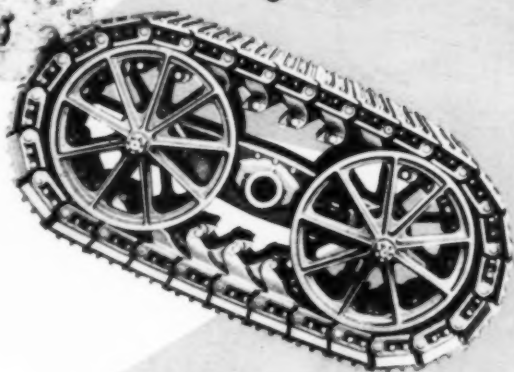
LINCOLN "SHIELD-ARC" WELDING

THE LINCOLN ELECTRIC COMPANY
Cleveland, Ohio

Authoritative Information on Design • Production • Welding Equipment



When this large Federal power project was begun, six 16-yard Athey Quarry-Type Trailers were on the job. So outstanding was their operation under varying ground conditions that ten more units were purchased.



MAINTAIN SHOVEL OUTPUT

Under All Job Conditions

Every day is a "working day" with Athey Forged-Trak Trailers on the job. For, come what may in weather and ground conditions, hauling keeps on without costly interruption or delay, thereby maintaining consistent shovel production.

Steady, all-weather operation—without delay or interruption—is the reason why Athey Trailers are used on so many defense projects. For complete information see your "Caterpillar" dealer, or write us for Bulletin No. 701.

ATHEY
TRUSS WHEEL CO.
5631 West 65th St., Chicago, Illinois
Cable Address: "Trusswheel", Chicago



Constant travel of the tractors and trailers compacted the muddy haul road, making possible tandem operation with double capacity to haul a heaping 32 yards each trip.



After hauling out the wet, sandy loam, the tractors and trailers demonstrated their versatility by hauling heavy rock.



Top Speed All Day Long

This Link-Belt Speeder machine has been taking it on "the chin" day in, day out. Two eight hour shifts every day—smashing through rock—clearing the field for National Defense Projects.

The machine works faster and more efficiently than any other machine of similar capacity. Speed-o-Matic control and clutches make such performance possible. You get greater output for two basic reasons:

1. Speed-o-Matic permanently eliminates all "lost motion" in the controls, in addition to actuating clutches smoother and faster than possible by any other method.
2. It relieves the operator of all manual effort and enables him to maintain top efficiency throughout the entire shift.

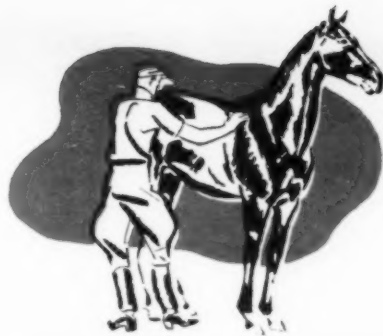
Performance records of hundreds of Link-Belt Speeder owners prove that Speed-o-Matic increases output 25% and more. Find out why and how Speed-o-Matic will increase your profits. Write for full particulars today.

LINK-BELT SPEEDER CORPORATION

Builders of the Most Complete Line of Shovels and Cranes

301 WEST PERSHING ROAD

CHICAGO, ILLINOIS



SMOOTH AS CONCRETE FORMED AGAINST PLYFORM



Remember, Plyform serves as sheathing and lining combined!

● You have less work and expense—and far superior results—when you form your concrete against Plyform, the grade of Douglas Fir Plywood made especially for concrete form work.

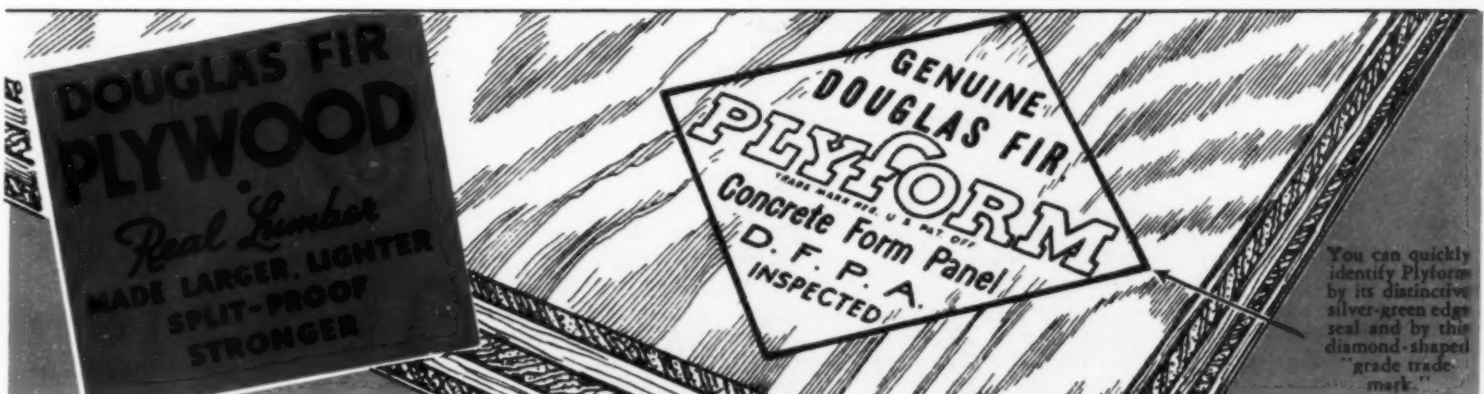
Plyform serves as sheathing and lining combined. The big, rigid, lightweight panels require no special bracing or construction, can be erected and stripped easily. Plyform works readily with hand or power tools, can be nailed without boring holes. When handled with reasonable care, Plyform gives numerous re-uses—then can be salvaged for utility purposes.

Plyform is made from special veneers and premium glues. It comes from the mill sanded satin smooth, oil-treated and edge-sealed. Its uniform, non-absorbent surface forms smooth, flawless concrete unmarred by mottling, stains or color. Joints and fins are absolutely minimized; cost of rubbing labor is cut from 5c to 12c a square foot.

Every genuine panel of Plyform is stamped with the "grade trade-mark" shown below. Use it when you specify and order; look for it on the panels you receive. For free Concrete Form Booklet or technical assistance, write Douglas Fir Plywood Association, Tacoma Building, Tacoma, Washington.

Above: Lou Henry Hoover School, Whittier, Calif. Wm. H. Harrison, arch.; I & B Construction Co., contr. Plyform was used on both the interior and exterior of this beautiful school to form flawless concrete surfaces.

Below: Broadway Department Store, Pasadena, Calif. Albert B. Gardner, arch.; C. L. Peck, contr. This is another example of the perfect architectural concrete that can be formed easier and cheaper against Plyform.



ADVANCE OF NATIONAL



A crusher in the hills. A black top plant by a siding. Compressors, shovels, tractors, trucks on location. Defense implements all!—whether the project be road building for better transportation of armies, equipment, supplies . . . or clearing sites for airports, cantonments, munitions works . . . or dredging waterways and dry docks for shipping . . . or stripping ore for needed raw materials . . . or even normal industrial and municipal improve-

ments which help to make the nation stronger.

For these and many other activities, the first great need is **POWER!** Portable power! Dependable power! Fast job-executing power! Economical power! "*Caterpillar*" Diesel is that kind! Put it to work on any kind of power equipment, and the job moves along toward completion with volume speed, minimum time out, and at lowest week-in-and-week-out power cost.

CATERPILLAR TRACTOR CO. • PEORIA, ILLINOIS

THE SUPERIORITY OF "CATERPILLAR" DIESEL ENGINES LIES IN THE COLLECTIVE ADVANTAGES OF SUCH FEATURES AS THESE:

1. **Simplicity.** No frequent or delicate adjustments.

2. **Exclusive fuel system.** Burns even such extra-cheap fuel as No. 3 domestic burner oil; burns it cleanly and economically at all loads and speeds.

3. **"Hi-Electro" hardened cylinder liners and crankshaft journals.** "Hi-Electro" hardening gives far greater wear-resistance to these parts than can be

obtained by any other practical method of heat-treatment.

4. **Dual engine cooling.** Both oil and water are temperature-controlled—meaning longer life, lower maintenance for bearings, pistons, rings and liners.

5. **Superior protection against dirt and grit.** Oil-bath air cleaners. Combination absorbent and metal-edge type oil filters. Absorbent type fuel filters. En-

closed valve-operating mechanism and flyball governor. Sealed at all points against entrance of dirt.

6. **High-quality materials and precision manufacture**—maximum efficiency, minimum maintenance and long service.

• **Specify "Caterpillar" Diesel Power in the equipment you buy—and give yourself the further advantage of engine replacement-parts and service facilities having no equal for completeness and availability.**

GUARDS DEFENSE!

NEW MEXICO. A "Caterpillar" Diesel D17000 Engine drives this Cedar Rapids crushing plant producing 200 tons of 2-in. material and fines per hour. Engine in operation 14 hours a day, uses 6 gals. of 7½c fuel per hour. A "Caterpillar" Diesel D6 Tractor with LeTourneau bulldozer feeds the hopper.



CALIFORNIA. A "Caterpillar" Diesel D11000 Engine powers this Bucyrus-Erie shovel loading trucks for road building at Camp San Luis Obispo. A fleet of "Caterpillar" Diesel Tractors also on this job.



MICHIGAN. Two "Caterpillar" Diesel Electric Sets (66,000 watts each) furnish power for electric motors in this plant manufacturing black top paving mixture. Producing 1120 tons per 14-hour day.



CALIFORNIA. A "Caterpillar" Diesel D11000 Engine drives this Gardner-Denver compressor furnishing air for five jack-hammers on blasting work. (Same project as in shovel picture.)

CATERPILLAR DIESEL

ENGINES AND ELECTRIC SETS • TRACK-TYPE TRACTORS • ROAD MACHINERY

- MINE SHAFTS AND SLOPES of the Pemberton Coal & Coke Co., Affinity, W. Va.
- CONTRACTOR: I. F. Vest, Bluefield, W. Va.
- DEALER: Byus-Mankin Lumber Co., Beckley, W. Va.

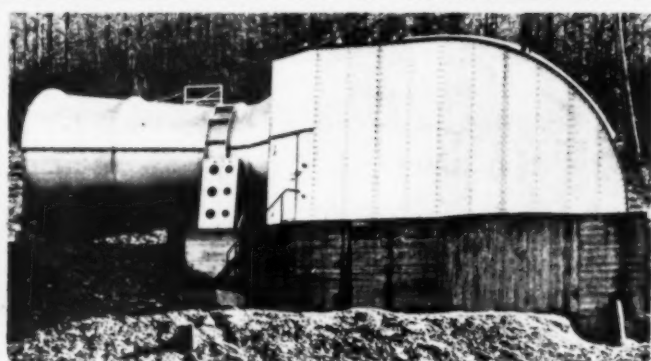


Water's out of order in a mine

To open up a new coal seam in this West Virginia mine an air shaft and two slopes had to be driven. As is often the case underground, plenty of water was encountered.

In order to reduce the threat of water penetration Lehigh Early Strength Cement was used . . . both to get service-strength concrete in 1/3 to 1/5 the normal time, and to get the denser, watertight concrete a mine should have.

Worth noting, too, was the use by the contractor of only one set of forms. As soon as a section was excavated the forms were moved forward



• Ventilating fan and housing atop air shaft of Pemberton mine at Affinity, W. Va.

and the pour made . . . a time-and-money-saving procedure being practiced more and more.

In *any* concrete work you can prove the advantages of Lehigh Early Strength Cement . . . quicker occupancy; lost time made up; reduction of overhead; better co-ordination of work of other trades. Shortening the curing time of concrete to as little as 1/5 the normal time means efficiencies that must be reckoned with. The Lehigh Service Department will gladly answer any questions.

Lehigh

EARLY STRENGTH CEMENT
FOR SERVICE-STRENGTH CONCRETE IN A HURRY

LEHIGH PORTLAND CEMENT COMPANY • ALLENTOWN, PA. • CHICAGO, ILL. • SPOKANE, WASH.



"Like sheets of rain"—VOLCANIC ASH day after day swept over the 7 ALLIS CHALMERS "HD14" 2-cycle Diesel tractors on the flood-control job at Walla Walla, Washington.

Let Eaton and Smith of San Francisco tell it. They are one of the two contractors who licked this 3,000,000-yard job.

"When the wind blew, we had to stop work for fear of collision. This was no ordinary dust, but an ash so fine it floated in the air—full of grit and abrasive. It penetrated everything—but RPM DELO did a great job."

Thanks to its exclusive compounding, RPM DELO controls engine wear, even under adverse conditions. What's more, it prevents ring-sticking—ends sludge trouble—"stays put" at hot spots which other oils tend to leave dry.

It has *doubled* engine life. See what it can do for *your* Diesels.

ORDER RPM DELO
Unequaled
FOR YOUR DIESELS

Approved by the makers of over 95% of the installed Diesel horsepower in America, RPM DELO is marketed under the following names:

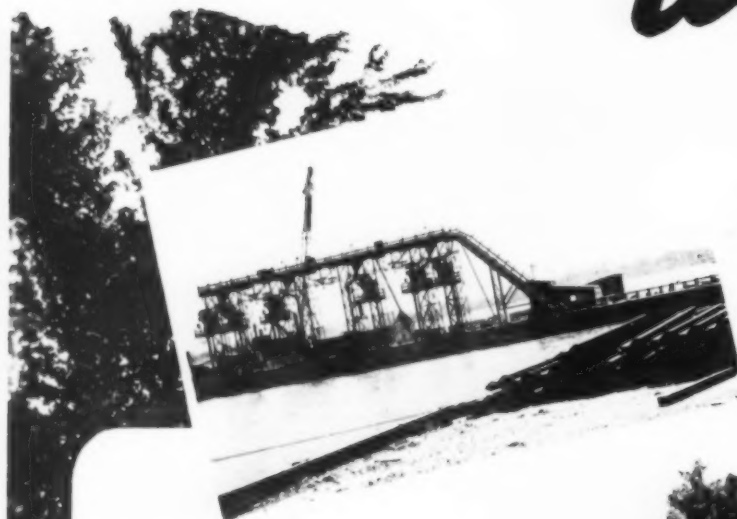
RPM DELO
Kysco RPM DELO
Sohio RPM DELO
Signal RPM DELO
Caltex RPM DELO
Imperial RPM DELO

Ask your Diesel engine manufacturer or distributor for the RPM DELO supplier in your locality.



STANDARD OIL COMPANY OF CALIFORNIA

INSLEY *delivers...*



Left: The unique method of placing concrete in the Navy dry-dock at Philadelphia included the use of 8 Insley towers with hoppers and sliding frames.

The Navy Yards at Norfolk, Bayonne, and Brooklyn also have availed themselves of Insley's facilities for similar equipment.

Below: Excavating in close quarters is made easier and faster by use of this Insley Type K clamshell.

On the world's newest dry-dock at the Philadelphia Navy Yard, 8 specially designed towers, hoppers, and sliding frames—all bearing the Insley trademark—handled all the concrete for dock's (14 ft. thick) floor seat. With this latest accomplishment—calling for advanced design and construction—the Insley Manufacturing Corporation continues its 36-year-old tradition for "doing the unusual" in the manufacture of modern, economical and dependable construction equipment . . . a tradition that stems from Insley's maintenance of a resourceful, skilled personnel and up-to-the-minute production facilities . . . a tradition that enabled Insley to pioneer the small shovel field, and specialize in the manufacture of $\frac{1}{8}$ and $\frac{1}{2}$ -yard excavators, the Insley K-10 and K-12. For every material handling job—large or small, old or new—Insley will do it in the traditional Insley way—faster and more profitably. Insley Manufacturing Corporation, Indianapolis, Indiana.



Below: The complete trench box attachment for Insley Type K is designed for quick change from any other attachment.

Below: The Insley Type K swings faster, travels faster . . . on many jobs, handles more material rated capacity.

Below: Insley Readymix Receiving Buckets offer the fastest and most economical method of handling concrete, direct from truck to forms, where hoisting equipment is available.



INSLEY

INSLEY MANUFACTURING CORPORATION, INDIANAPOLIS, INDIANA

Get Bigger Loads Quicker

Cut Scraper Loading Time

Move More Yardage per Shift



CONCRETE—Here on a Virginia airbase, concrete ranged from 8 to 17" thick, but this LeTourneau K-30 Rooter, pulled by a "Caterpillar" D8 tractor broke up a 1/4 mile of it in 2 hours. Then, Virginia Engineering Co., loaded and hauled out the broken slabs with Carryalls, thus saved the expense of bringing in a shovel and trucks.

LeTOURNEAU ROOTERS

Make low-cost dirt of Hard-to-handle Material

LeTourneau Rooters enable you to handle practically all excavation, short of solid rock, with Carryall Scrapers. On most jobs they eliminate the need for shovels and trucks . . . or compressors for drilling and blasting . . . thus save you money on equipment costs. Rooters are faster, safer and far cheaper. They give you better fragmentation for scraper loading, too. This fragmentation makes scraper loading much easier, reduces loading time a third to a half, enables you to use larger Carryalls with the same tractor power. Like hundreds of other alert earthmovers, you'll find LeTourneau Rooters can increase your profits in tough materials. Ask your LeTourneau-"Caterpillar" dealer to put one on your job . . . see for yourself what it can do for you . . . NOW.



SUNBAKED CLAY—In hard, sunbaked clay on this Texas highway project, use of a LeTourneau Rooter reduced Carryall loading time and distance 66 2/3%!



HARDPAN—This LeTourneau K-30 Rooter and "Caterpillar" D8 tractor broke up the hardpan shown here so well that 20-yard Carryall loads were picked up without a pusher on the job of Harms Bros., and N. M. Ball in California.



AVERAGE DIGGING—Even in lightly compacted earth, use of a LeTourneau Rooter will more than pay for itself by cutting loading time and increasing yardage per load, as here on L. G. Arnold's job near Hopkinsville, Ky.



SHALE—LeTourneau Rooter and D8 tractor loosening shale on a West Coast highway relocation for Guerin Bros. Without removing the Rooter, the same tractor is used to bulldoze the loosened material to the fill.

*DON'T BLAST
use a
ROOTER*



For Lowest Net Cost per Yard

CARRYALL* SCRAPERS ANGLEDZERS*, BULLDOZERS, ROOTERS*, POWER CONTROL UNITS, TRACTOR CRANES, PUSHDOZERS, SHEEP'S FOOT ROLLERS, TOURNAPULLS*, TOURNATRAILERS*, TOURNACRANE.

*NAME REG. U. S. PAT. OFF.

LETOURNEAU

PEORIA, ILLINOIS • STOCKTON, CALIFORNIA



***It Won't Happen Again—All Windbreaks
and Covers are now FIRE CHIEF Finished***

Six months ago, 300,000 sq. ft. of flammable canvas, used in the midwestern construction job shown above, blazed to a \$500,000 loss in canvas, scaffolding and building damage.

The contractor decided then and there to strike out the fire hazard of flammable canvas from future construction work.

He purchased FIRE CHIEF Finished Duck — with the permanent fire-resisting finish that won't wash out — for all his new tarpaulins and windbreaks.

If unprotected canvas presents a fire hazard

for you from hot coals, sparks, hot rivets, welding operations or workmen's torches, carelessly thrown cigarettes and matches — FIRE CHIEF Finished Duck will assure new safety.

Approved by the Underwriters Laboratories and the Associated Factory Mutual Fire Insurance Companies, FIRE CHIEF also meets all Government requirements for a fire-, water-, weather- and mildew-resistant canvas.

WM. E. HOOPER & SONS CO.

PHILADELPHIA

New York

Chicago

Mills: WOODBERRY, BALTIMORE, MD.

FIRE CHIEF

***The Finish That
WON'T WASH OUT***

CEMENT DISPERSION

and its five advantages

OBTAINABLE WITH POZZOLITH



Unusual installation of an Imhoff Tank where Pozzolith Concrete was poured on a 45 degree slope without the use of forms. In the maze of reinforcing steel Pozzolith created easier, quicker placeability.

AN OUTSTANDING TECHNOLOGIC ADVANCE THAT BENEFITS ALL CONCRETE

Application of the Principle of Dispersion through POZZOLITH raises the efficiency of portland cement to the maximum and produces these advantages:

1. Durability increased 50% or more.
2. High Early Strength — 20% or more increase in compressive strength at all ages.
3. Water reduction, up to 20% — slump increased 150% or more for given water ratio.
4. Increased water-tightness — 20% or more reduction in absorption and permeability.
5. Reduced bleeding and segregation.

SPEED AND ECONOMY

In addition to the above advantages POZZOLITH speeds up the job but adds no increased over-all cost and in many cases substantial savings are made.

WIDELY USED

Ten years of use by representative engineers, contractors and owners, everywhere, have now made its acceptance general.

MAKES ALL THE CEMENT WORK

Today hundreds of thousands of cubic yards are being placed on defense and industrial projects more quickly, more easily, and with greater economy through the cement-dispersing ability of POZZOLITH which exposes the entire surface area to the water and thus makes all the cement "work". The complete story of Cement Dispersion and POZZOLITH will be sent on request.

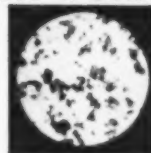
THE MASTER BUILDERS COMPANY

CLEVELAND, OHIO

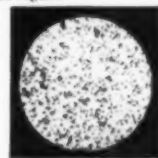
TORONTO, CANADA

HOW POZZOLITH WORKS

Pozzolith contains Master Builders' cement dispersing agent. Cement particles in their normal state in water tend to gather together in bunches; i.e., flocculate. This bunching entraps water within the particle clumps. See microphotograph at right.



UNDISPERSED



DISPERSED

With Master Builders' dispersing agent these bunches are broken up into individual cement particles distributed throughout the water; i.e., dispersed or deflocculated. See microphotograph at left.

This dispersion makes the cement usable to its full efficiency; all the cement surface is made available for hydration and all the water for lubrication of the mix. (Water held within the particle clumps is released.)

As a result of adding Pozzolith to cement mixes there occur the five advantages listed.



CEMENT DISPERSION SPEEDS DEFENSE — SAVES MONEY!

"Remember — by adding POZZOLITH to regular portland cement, purchased at economical prices, you get high early strength and a more rapid completion of the job. Here is economy in material cost and time."

MASTER BUILDERS

CHEVROLET TRUCKS

with "Load-Master" Engine

The Greatest Power-Pullers in Economical Transportation



Truck operators, large and small, buy more Chevrolet trucks than any other make, year after year.

Small wonder that they are buying more Chevrolet Heavy Duty trucks this year! For sturdy Chevrolets with "Load-Master" valve-in-head engine have greater pulling power than any other trucks in their field. They are "tops" for total dependability—engineered to haul big loads with the speed that these fast-moving days require—priced to cost you less than any other trucks in the biggest-selling low-price field.

Truck operators everywhere have decided that Chevrolets are first choice for making "DELIVERIES P.D.Q."—powerfully, dependably, quickly.

To solve your haulage problems, and solve them efficiently and economically, follow this nationwide swing to Chevrolet. Your Chevrolet dealer is ready to give you a convincing demonstration, any time you say.

CHEVROLET MOTOR DIVISION, General Motors Sales Corporation, DETROIT, MICHIGAN

"THRIFT-CARRIERS FOR THE NATION"

Page 26—CONSTRUCTION METHODS—August 1941

FEATURES

- * TWO NEW VALVE-IN-HEAD ENGINES . . . STANDARD: 174 FOOT-POUNDS OF TORQUE—90 HORSEPOWER . . . "LOAD-MASTER": 192 FOOT-POUNDS OF TORQUE—93 HORSEPOWER*
- * NEW RECIRCULATING BALL-BEARING STEERING GEAR *
- * NEW, MORE COMFORTABLE DRIVER'S COMPARTMENT

*Optional on Heavy Duty models at extra cost

60 MODELS

ON NINE LONGER WHEELBASES
. . . A COMPLETE LINE FOR ALL
LINES OF BUSINESS

It still takes a NORTHWEST to beat a NORTHWEST

- DUAL INDEPENDENT CROWD
- ALL WELDED SHOVEL BOOM
- UNIFORM PRESSURE SWING CLUTCHES
- ALLOY CAST STEEL BASES
- CUSHION CLUTCH
- "Feather-touch" CLUTCH CONTROL
- HELICAL GEAR DRIVE
- DIFFERENTIAL STEERING

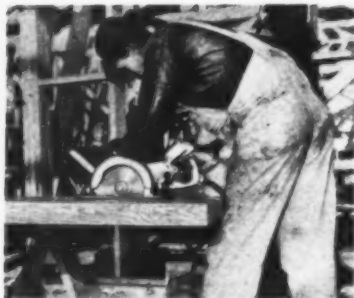
CHECK any other machine, for
this combination of advantages
offered by Northwest.

NORTHWEST ENGINEERING COMPANY
1728 Steger Building, 28 E. Jackson Boulevard
Chicago • Illinois





INSULATION MATERIAL being cut to size right on the job with the famous B & D Electric Quick Saw. One of the many ways the No. 85 Saw helps trim operating costs.



ON HEAVY CONSTRUCTION JOBS where extra deep cutting is required, the powerful B & D No. 95 Saw has ample power to cut through toughest structural lumber.



FAST, CLEAN CUTS IN STONE made easy by this husky No. 95 Black & Decker Saw and abrasive disc. This larger unit has extra depth of cut for heavy sawing work.



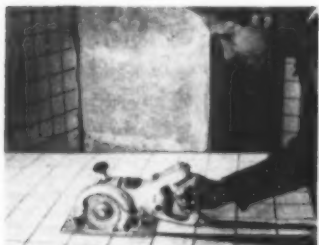
SAWING FORM LUMBER for concrete foundations or other construction purposes is a fast operation with Black & Decker's powerful No. 85 Portable Electric Quick Saw.



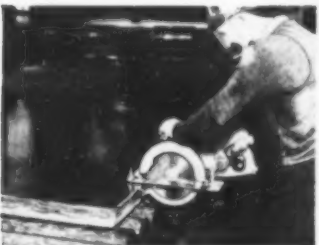
Speed Up your Building Program with **Black & Decker Electric Saws**



EASY, ONE-HAND OPERATION — cutting off gable end of porch with powerful B & D No. 85 Quick Saw. Cuts structural lumber faster and better with minimum fatigue.



TRIMMING TILE-BOARD to size—one of the many ways builders are speeding up jobs with Black & Decker Saws. Small, light model B & D Saw is easier to handle on trim work.



SHEET LEAD BEING CUT with No. 95 Black & Decker Saw—an example of the many industrial applications of these Saws in cutting both iron base and non-ferrous metals.



CARRY THIS "SAW-MILL" to the job! Black & Decker Electric Saws mounted on handy Portable Electric Saws Tables convert the units into super-speed, stationary Saws. They're real time savers on the job.

TEN TIMES FASTER THAN HAND SAWING, Black & Decker Portable Electric Saws are saving valuable hours today on national defense projects, home building, and industrial construction. Models are available to fit any sawing job, plug into any electric socket or portable generator, cut almost any material. All Black & Decker Saws have safe, telescoping blade guards and easy adjustments for depth and angle of cut. Write for your copy of the free "Saw Handbook" described below.



SAWING STAIR STRINGERS with Black & Decker No. 85 Electric Saw. One of dozens of building operations this fast Saw performs in a fraction of time required by hand. B & D also has a complete line of saw blades.



NO JOB TOO TOUGH! Illustration shows a B & D Saw fitted with abrasive disc cutting corrugated asbestos-cement material smoothly, quickly and accurately.

Black & Decker Saws help push Defense Construction by serving on projects from coast-to-coast to put new speed in all building operations. Shown here is a No. 85 Black & Decker Electric Saw cutting stair stringers in a fraction of usual time.

Send for Free "SAW HANDBOOK"

Illustrated 28-page book shows the construction, operation and wide applications of Black & Decker Saws and Accessories. This "Saw Handbook" points out many new time-and-money-saving ways Electric Saws help speed up jobs. Write for your Free Copy today! The Black & Decker Mfg. Co., 759 Pennsylvania Ave., Towson, Md.

"ELECTRIC TOOL HEADQUARTERS"



LEADING DISTRIBUTORS EVERYWHERE SELL

Black & Decker

**PORTABLE
ELECTRIC TOOLS**

ABSOLUTELY, YOU CAN MAKE MORE MONEY with JAEGER

CHARGE FASTER
MIX FASTER
DISCHARGE FASTER

EITHER
HIGH DUMP
TYPE



Today's concrete production is going to Jaeger Truck Mixers, Agitators as fast as operators can expand their plants: (1) because the concrete industry has proof of the *higher quality* of material produced by the Jaeger Dual-Mix Drum; (2) because opportunities for comparison, on this year's gigantic projects, have proved beyond question that Jaegers, whether HIGH DUMP or Standard LOW CHARGE, can load, mix and discharge faster than any other mixers of their type.

Jaeger, alone, offers this higher payload production with standard 2-Speed Transmission (Separate Engine or Vacuum-Controlled Truck Engine Drive), One-Shot Top Loading, Vacuum-Controlled High Discharge Door, End-to-End Water Sprays and Mixing in Sealed Drums — in the only line that completely meets every specification and operating demand.



Combination Top or End Loading with Jaeger Hopper Attachment:

Specially adapted to older or temporary plants not equipped for fast ribbon loading. Permits top or end charging to meet conditions. Only end loader that does not constrict drum opening or require moving Hopper to discharge. Single turn of hand wheel opens Discharge Gate. No second seal to leak or wear.



OR

LOW CHARGE



A DRUM-FULL
— OR A CUPFUL
— AT A TIME

JAEGER PORTABLE HOPPER

Saves Truck Mixers Waiting—Means 25% More Payloads per Day on the Average Job.

Tows to job behind truck mixer —takes full 2 or 3 yd. batches. One hopper serves almost



THIS HANDY BLANK BRINGS YOU FULL INFORMATION:

Complete 1941 Data, Models, Specifications, Prices, Terms

THE JAEGER MACHINE COMPANY
800 Dublin Avenue, Columbus, Ohio

Send us newest information on ☐ Standard LOW CHARGE Truck Mixers, Agitators, ☐ HIGH DUMP Models, ☐ Portable Hoppers, ☐ Auto-Pavers and Spreaders, ☐ Pumps, ☐ Mixers, ☐ Hoists, ☐ Carts.

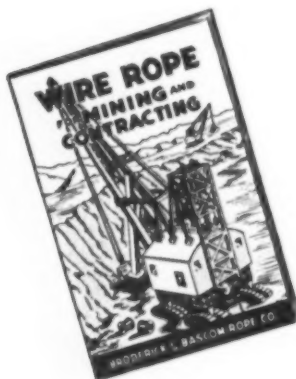
Name _____

Address _____





Earth Moving
is the first step



FREE—

**MINING and CONTRACTING
HAND BOOK**

You'll use this practical wire rope information often. 96 handy pages of facts, tables, illustrations. Send for your free copy today!

The housewife working the soil follows a plan as real as any blueprint. In order to cultivate flowers, she begins by *reshaping* the earth. She becomes a miniature counterpart of the vast earth-moving industry which molds city and countryside into new forms as the first step in public improvements.

Wherever machines are digging an excavation or leveling a highway, there are wire rope jobs that call for *stamina*—for tough-bred Preformed Yellow Strand. That's why you'll find it today, handling millions of cubic yards of pay loads, on scrapers, shovels, draglines and other equipment.

Yellow Strand has the correct *balance* of elasticity, strength and

flexibility, derived from finest steel wire, specially drawn. Limbered up by preforming, it resists drum crushing and kinking... installs and splices easily... runs smoothly over small sheaves. It takes just one typical operation to prove that Yellow Strand helps you keep cable in service longer, get more production out of equipment.

Contractors, plant engineers, oil drillers, miners—all experienced buyers pick wire rope for dependability in the *field*. Let us show you why Preformed Yellow Strand is the growing choice, on its record of long life and low *final* cost.

BRODERICK & BASCOM ROPE CO., ST. LOUIS
Branches: New York, Chicago, Houston, Portland, Seattle • • Factories: St. Louis, Seattle, Peoria

YELLOW STRAND **Preformed WIRE ROPE**

A Mainstay of Industry, Which Benefits the Public Through Its Service to
ROAD BUILDERS • GENERAL CONTRACTORS • PLANT ENGINEERS • ROTARY DRILLERS
LOGGERS • MINERS • QUARRY OPERATORS AND OTHER INDUSTRIAL SERVANTS





HERE'S WHERE ^a SHOVEL STARTS
Talking Your
LANGUAGE

21 POINTS OF PROFIT

IN LORAIN-80 DESIGN AND CONSTRUCTION

TURNTABLE

1. Double Center Drive pinion which —2. Applies power directly—fully concentrated on any one operation—
3. Or spreads power for high-speed simultaneous operations.
4. Two-piece swing drums designed to take the punishment of the hardest worked part of the shovel.
5. Crowd clutch, extra wide to deliver full digging power, mounted on roller bearings; two-piece, easily reversed bands.

CRAWLER

1. Center "Chain" Drive.
2. Two speeds either direction.
3. Steers either direction.
4. Safety travel and tread lock.
5. Mechanism runs in oil bath.

6. Generous underneath clearances.
7. Centralized lubrication.
8. Wider treads.

SHOVEL BOOM

1. All-welded (strength; all-steel; torsion-resisting).
2. All-steel dipper stick.
3. Door stops to protect stick.
4. Automatic power dipper trip.
5. Automatic crowd brake to hold stick extended.

CRANES, CLAMS, DRAGS

1. Simultaneous hoist, swing and travel (or boom derricking).
2. High-speed boom hoist—power and precision control of boom derricking and lowering.
3. "Cable-Miser" fairlead with interlocking, geared sheaves.



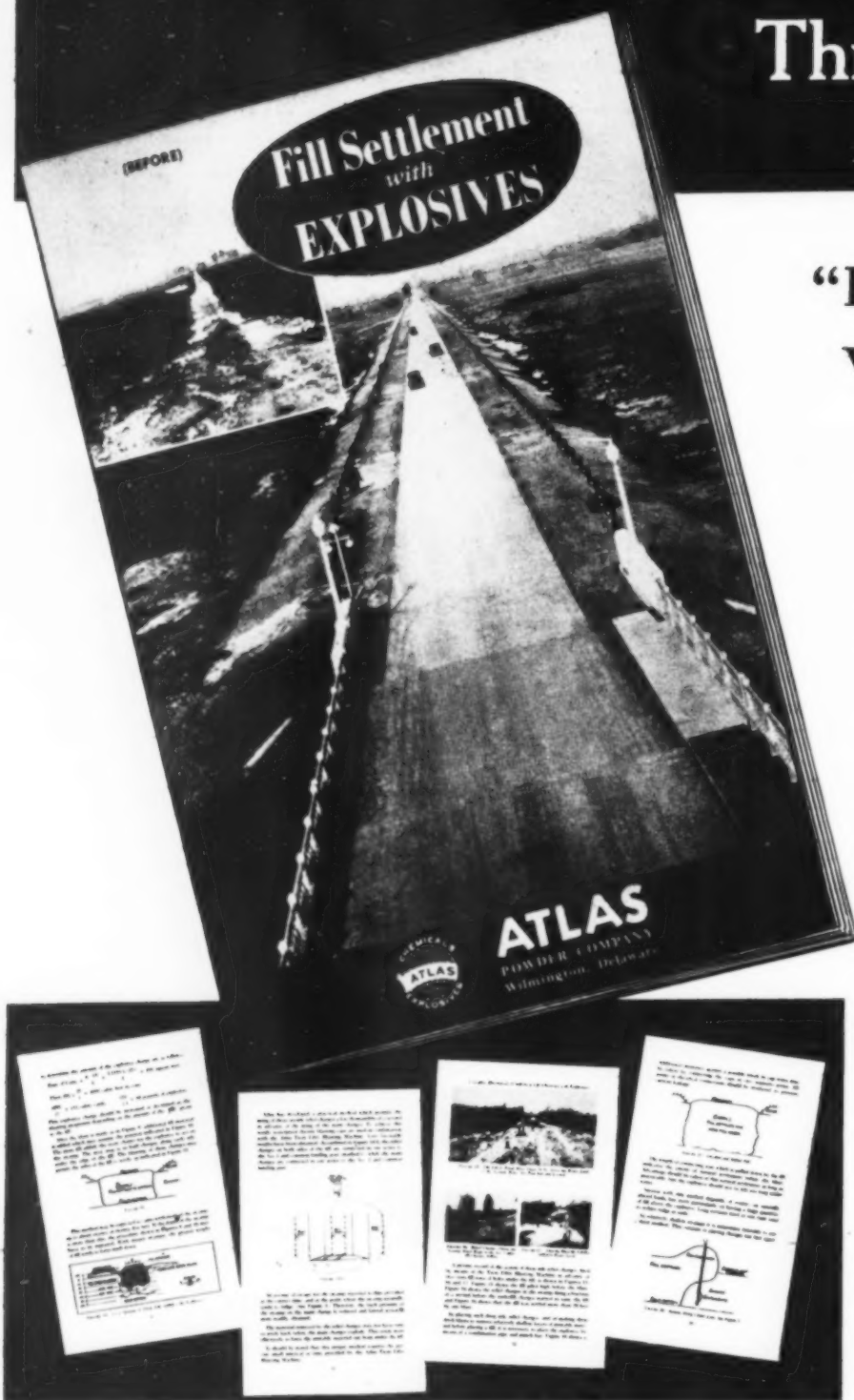
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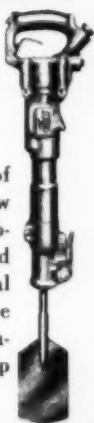
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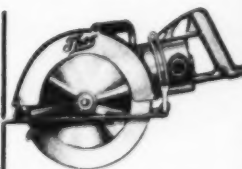


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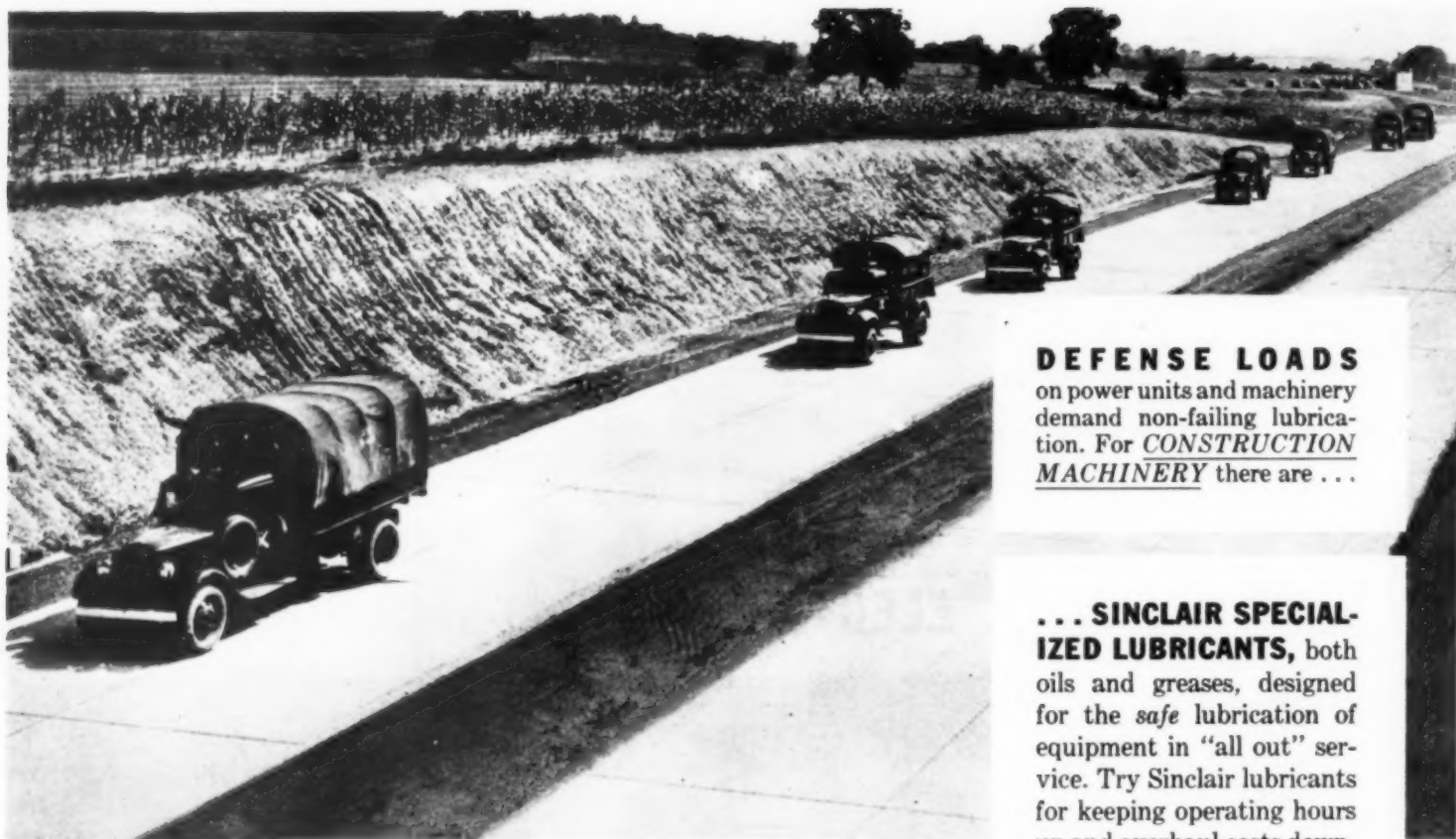
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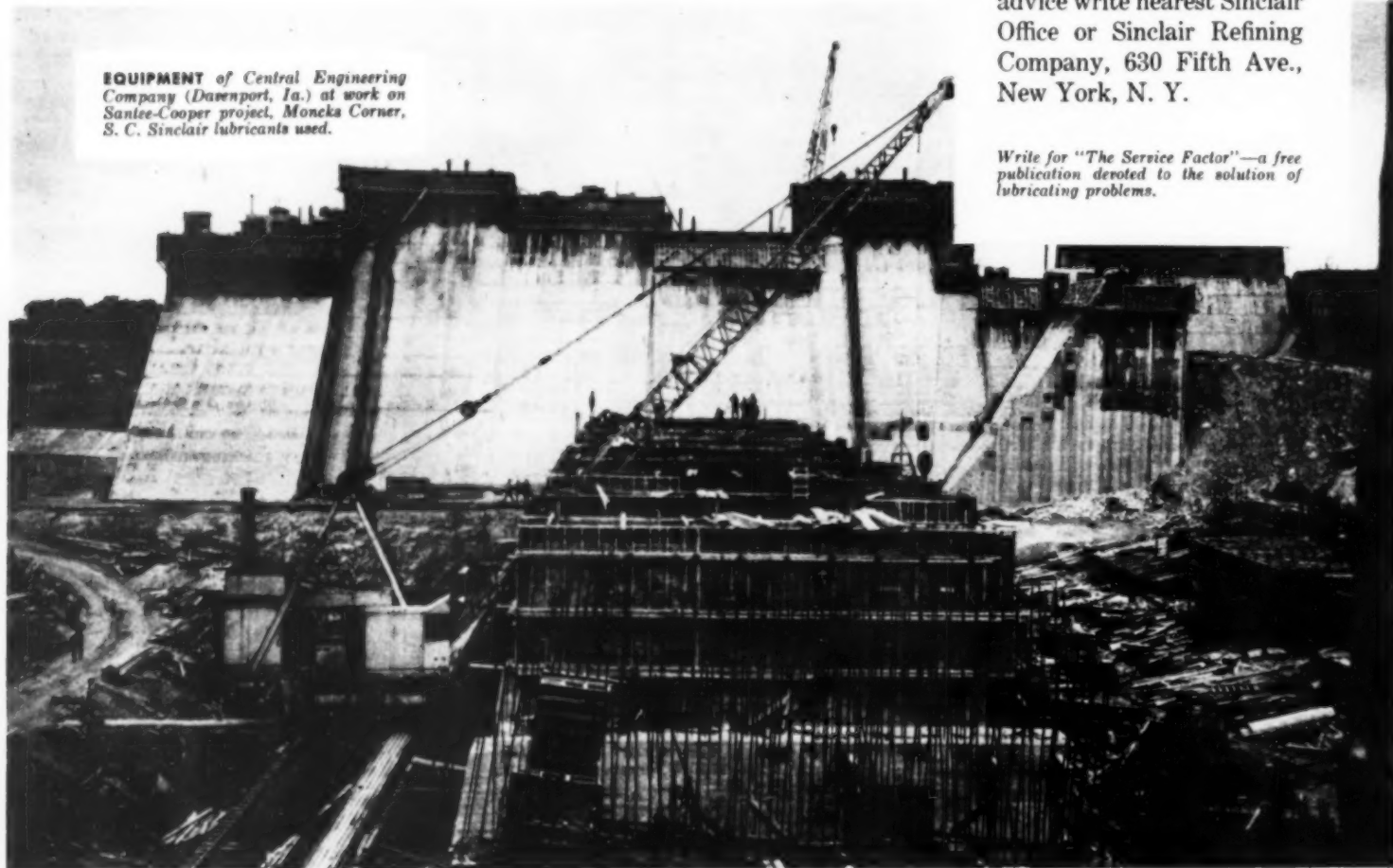
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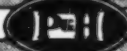
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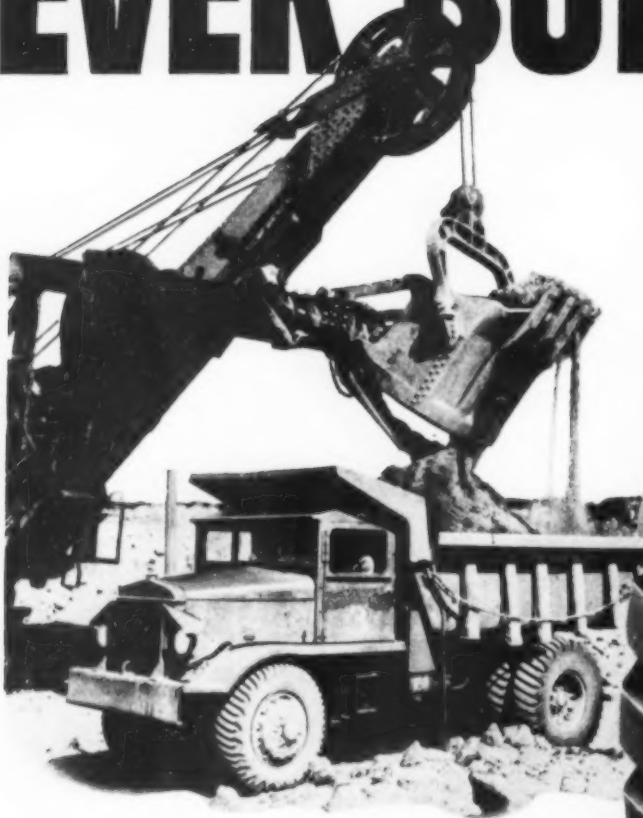
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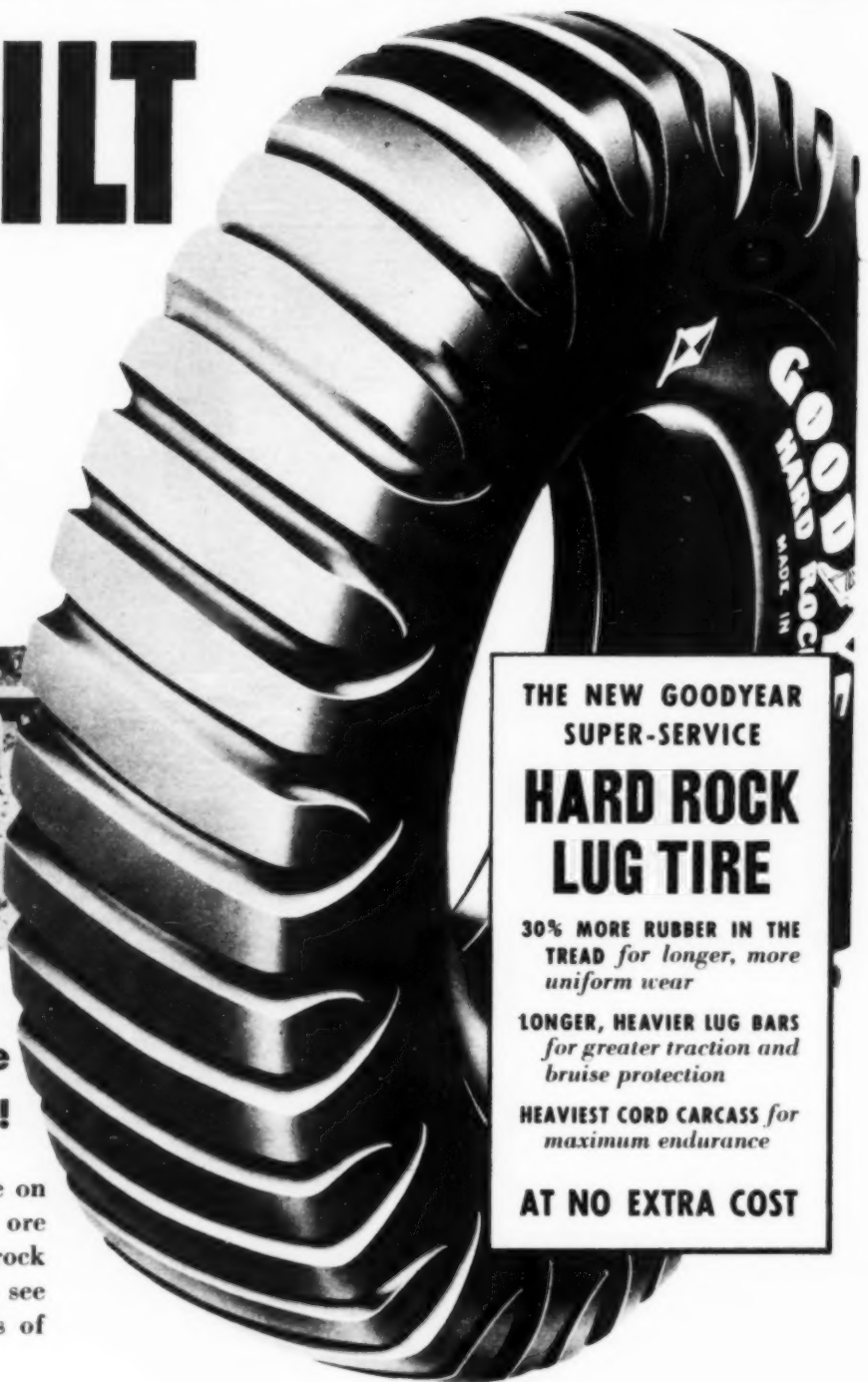
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Construction Methods

ROBERT K. TOMLIN, Editor

Volume 23

AUGUST, 1941

Number 8

Concrete "Igloos" Built to Store Ammunition

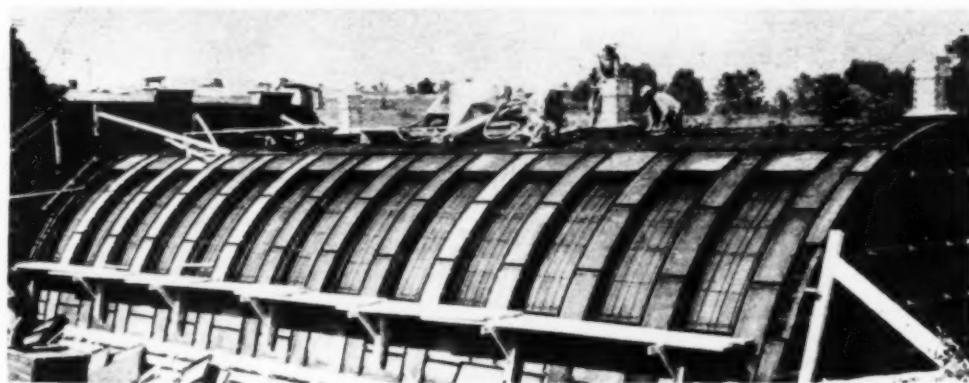
"IGLOOS" OF REINFORCED CONCRETE, comprising 700 units widely dispersed as a measure of protection against explosion, are being built by the Army Ordnance Department near Anniston, Ala., for the storage of live ammunition. Having the form of a barrel arch car-



INSIDE FORMS for concrete "igloos" are of steel liner plates bolted up to form barrel arch 60 ft. 8 in. long and 26 ft. 6 in. wide inside.

the aid of Armco steel liner plate forms of two widths, 18 and 36 in., joined by bolting. Concrete is delivered by truck-mixers and raised to place in bottom-dump buckets by cranes. As concrete is deposited in the walls of the arches the plates forming the outside forms are bolted up in horizontal tiers to retain it.

The igloo construction program is under the direction of Lieut. Col. Edmund Randall, constructing quartermaster. The contractors are Dunn Construction Co., of Birmingham, Ala., and John S. Hodgson Co., of Montgomery, Ala.

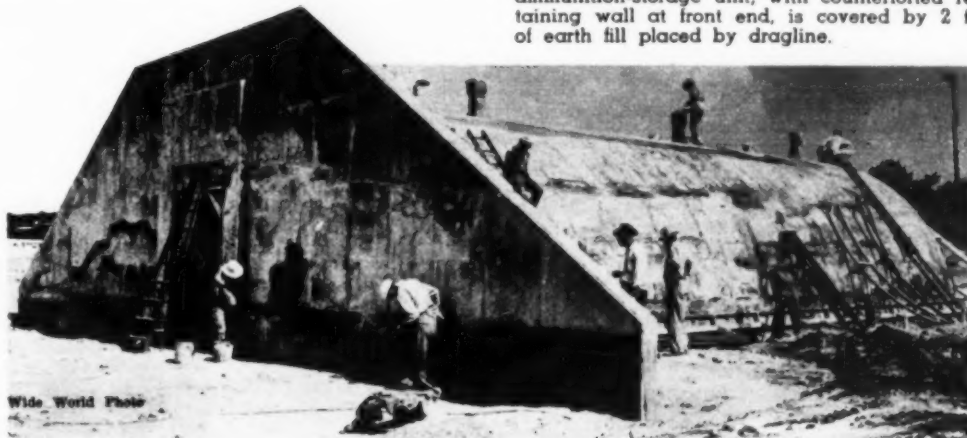


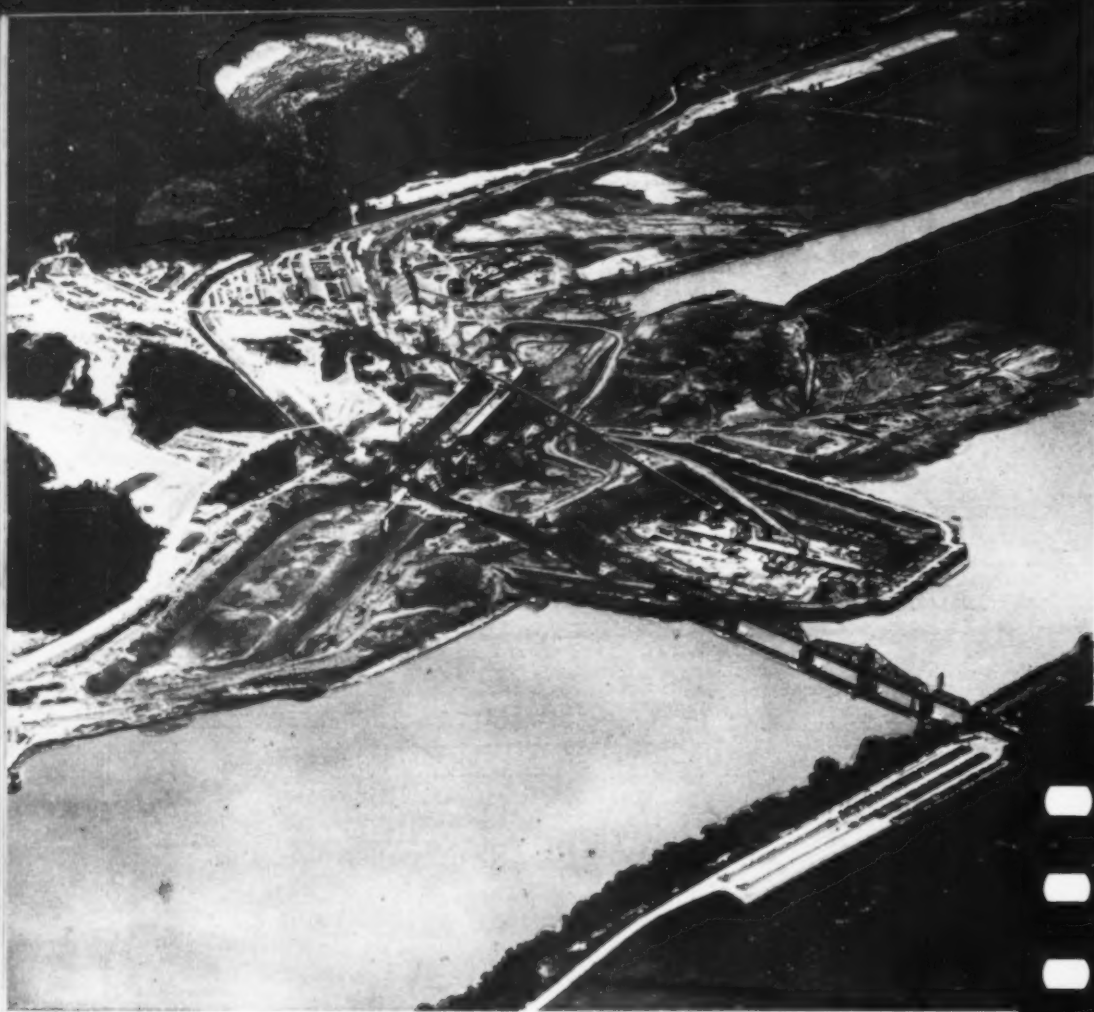
OUTSIDE FORMS are liner plates of alternate 18 and 36 in. widths. The 36-in. plates are bolted up in horizontal tiers between 18-in. plates as concrete is deposited in arch walls.

ried by spread footings over a concrete floor, each igloo is 60 ft. 8 in. long and 26 ft. 6 in. wide, inside dimensions. The thickness of the concrete arch is 6 in. at the crown and 12 in. at the spring line. When completed, each unit is covered by 2 ft. of earth fill, deposited by dragline.

Spaced at distances of 480 ft. on a series of parallel access roads located 450 ft. apart, the widely separated ammunition storage units are built with

AFTER FORMS ARE STRIPPED (below) concrete ammunition-storage unit, with counterforted retaining wall at front end, is covered by 2 ft. of earth fill placed by dragline.

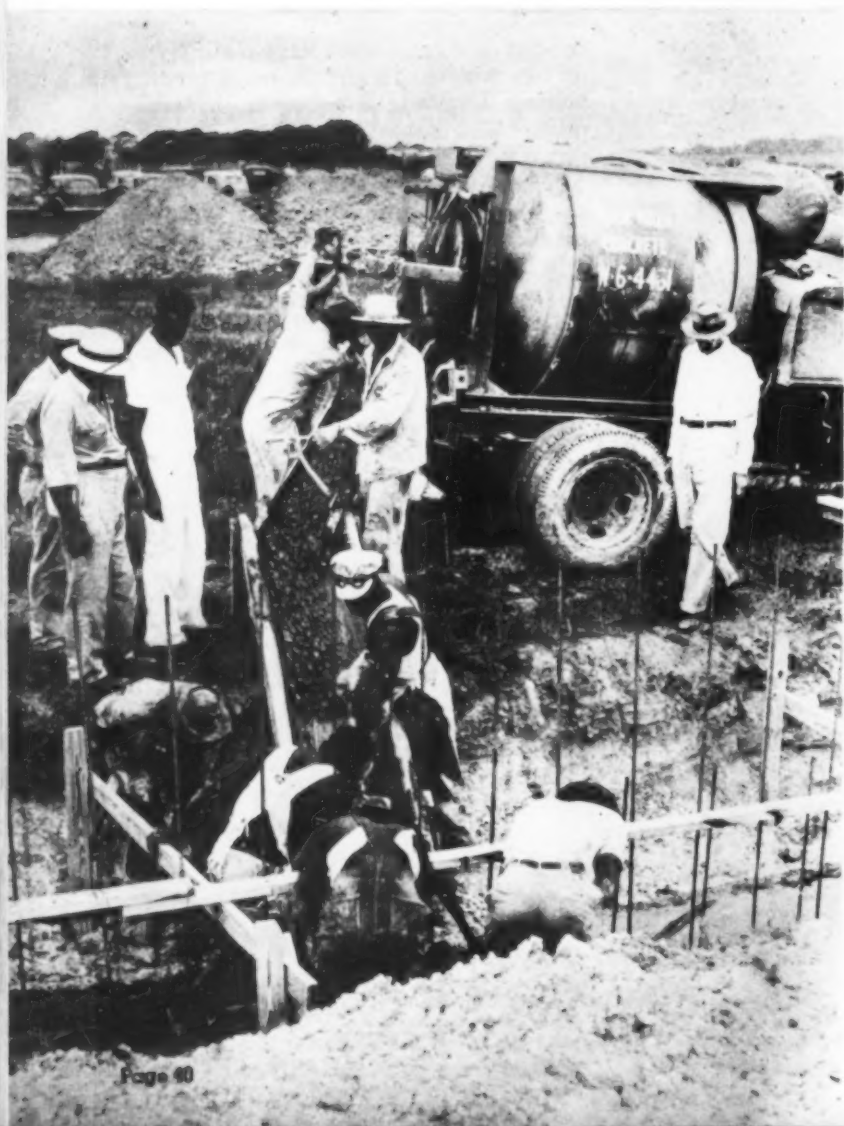




KENTUCKY DAM PROJECT moves ahead rapidly as TVA speeds up work to shorten construction of \$105,000,000 job by one full year. By spring of 1944, project will add 160,000 kw. of generating capacity, 184 mi. of 9-ft. navigation channel and 4,500,000 acre-ft. of storage to TVA system. Power house and spillway sections are being built in cofferdam; navigation lock to left is virtually complete.



THIS MONTH'S NEWS REEL



FIRST LARGE TIN SMELTER (left) in United States goes into construction at Texas City, near Galveston, Tex., with placing of concrete foundations for \$3,500,000 plant to process Bolivian tin ores. Ford, Bacon & Davis, New York engineering firm, is building plant for U. S. government; Tin Processing Corp. will operate. In charge of work (above) are: (left to right, standing) George H. Sager, Jr., engineer in charge; G. M. Anderson, chief accountant, and F. H. Dietze, engineer-superintendent, all of Ford, Bacon & Davis; (seated) A. Russell Merz, works manager, and J. van den Berg, vice-president and general manager, both of Tin Processing Corp.; and J. Owen Ambler, supervising engineer, Defense Plant Corp. and Metals Reserve Co., RFC subsidiaries.

Wide World Photos



HUGE AIRCRAFT PLANT for Curtiss-Wright Corp. at Columbus, Ohio, includes main 19-acre building made ready to begin production of parts 5 months after start of construction by general contractor. One of two 40x200-ft. electrically operated doors is visible in this end of building. Albert Kahn Associated Architects & Engineers, Inc., is architect for \$10,000,000 plant, and Darin & Armstrong, Inc., is contractor.



LAST SECTION of pipe is installed in Colorado River aqueduct distribution system now serving twelve cities of Metropolitan Water District of Southern California in Los Angeles area. Delivery of water to consumers through 392-mi. aqueduct system marks culmination of 18 years of engineering planning and 8½ years of actual construction. Frank E. Weymouth, general manager and chief engineer, lived to see completion of system before he died July 22, at age of 67.



U.S.-CANADA OIL PIPE LINE from Portland, Me., to Montreal is being rushed to completion by Standard Oil Co. of N. J. to deliver 50,000 bbl. a day to Canadian refineries and save long tanker trip through St. Lawrence River. Line 236 mi. in length, of 12-in.-diameter pipe laid in 40-ft. lengths with joints electrically welded, will cost \$8,000,000. Williams Bros. Corp., Tulsa, Okla., is building about two-thirds of pipe line from Gorham, N. H., to Montreal; Oklahoma Contracting Co., Dallas, Tex., is laying remainder from Gorham to Portland. Force of 1,700 men work 10-hr. shift seven days a week to complete job by Oct. 31. Oil is expected to start flowing Dec. 1. Williams Bros. also have under construction eight pumping stations which will boost oil on trip crossing maximum elevation of 1,950 ft. above sea level.

Wide World Photos

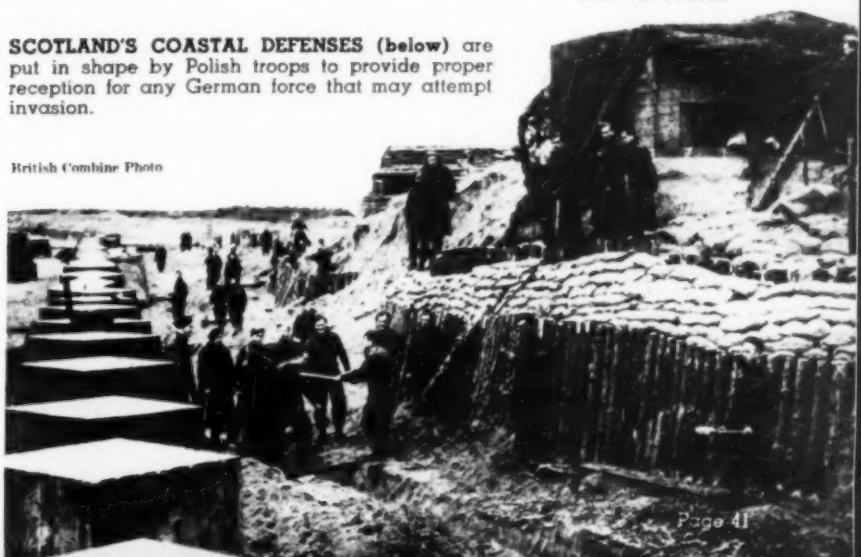


FOUR-HOUR JOB by 17th Engineers of Second Armored Division, U. S. Army, completes supplemental bridge to relieve traffic bottleneck on one-way structure, in background, during maneuvers near Manchester, Tenn.

Wide World Photos

SCOTLAND'S COASTAL DEFENSES (below) are put in shape by Polish troops to provide proper reception for any German force that may attempt invasion.

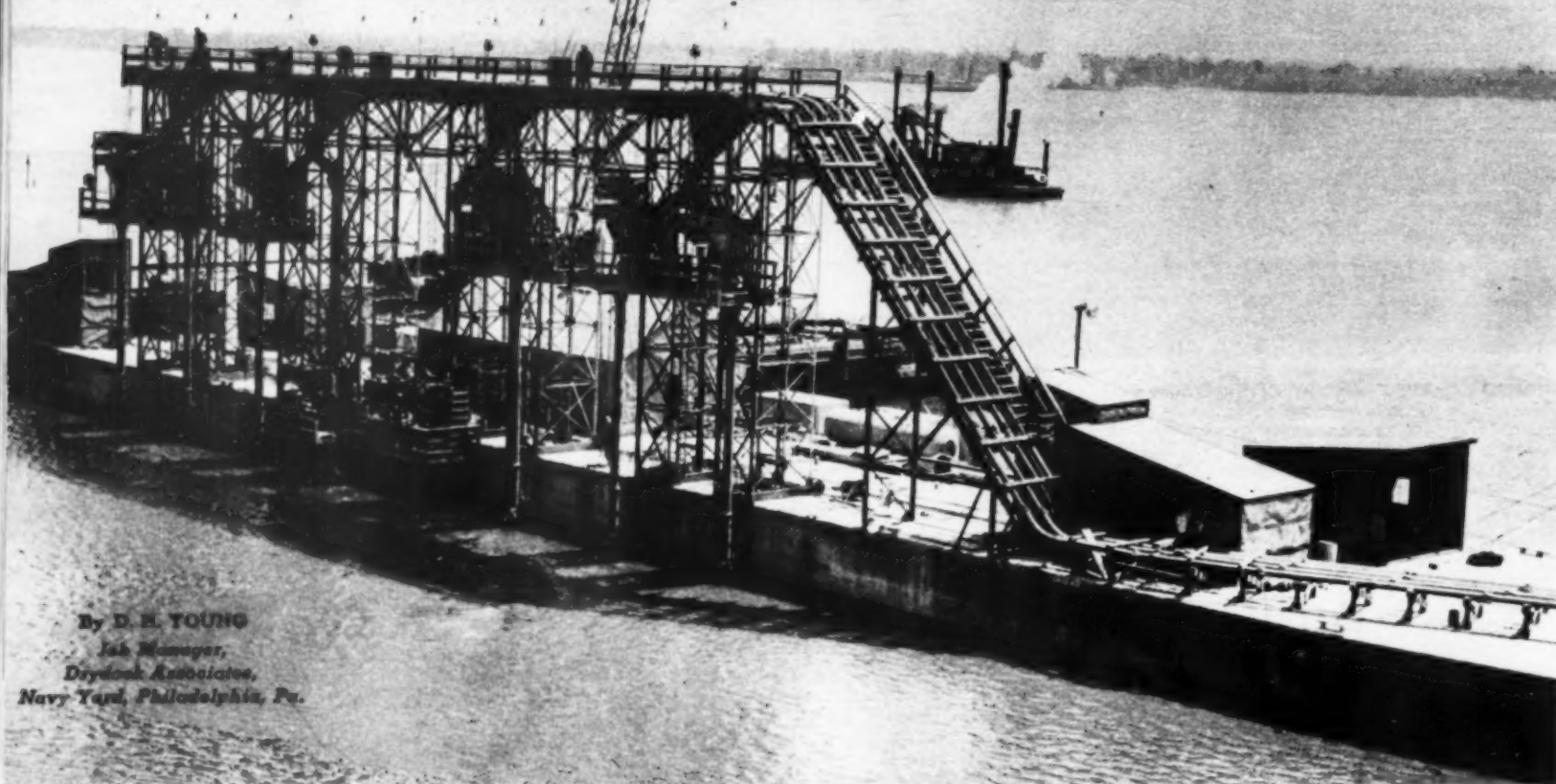
British Combine Photo



Navy's Huge Drydocks



BUILT IN DREDGED BASINS WITH PUMPED CONCRETE PLACED BY NOVEL TREMIE METHOD



By D. H. YOUNG
Job Manager,
Drydock Associates,
Navy Yard, Philadelphia, Pa.

AT THE INSTANCE OF THE NAVY DEPARTMENT, Bureau of Yards and Docks, three contracting firms, Spencer, White & Prentis, Inc., Foley Brothers, Inc., and Merritt-Chapman & Scott Corp., were combined for convenience under the name of Drydock Associates and received contracts for the first three in the series of gargantuan new-type ship-building drydocks the United States Navy had scheduled for the national defense program. Two of these three drydocks are located in the Philadelphia Navy Yard, and one at the Norfolk Navy Yard, Portsmouth, Va.

The docks, 1,100 ft. long and 150 ft. wide, will rank near the top of the list of the world's largest drydocks. The sill of the dock at Norfolk will be 45.7 ft. below low water, and those at Philadelphia are to be 33.8 ft. below low water. These docks will cost more than \$10,000,000 each and are designed to accommodate the super-battleship of tomorrow.

In contrast with inclined shipways upon which all large battleships have heretofore been constructed and skidded into the water, with the attendant danger of breaking the ship in two at the launching due to poppet and way end pressures, the Navy's largest ships will be laid on an even keel in the future and floated off the keel blocks by flooding the new-type docks. The high overhead superstructures normal to large shipways will be eliminated, and a

EIGHT 60-FT. TREMIES fed by hoppers moved up and down on vertical steel towers are mounted on 337x47-ft. barge for placing concrete under water in 14-ft. thick floor slab of drydock. Eight-inch pipe lines from four Pumpcrete machines deliver concrete for tremie placement to four fixed hoppers, on top of bridge, from which divided spouts, or "pants-legs," discharge into movable receiving hoppers on upper ends of tremie pipes. Two tremies near center of barge are shown lowered into position for pouring; on other six tremies pipe valves are shown just above water level.



JOB MANAGER for Drydock Associates, contractors for big drydock project at Philadelphia Navy Yard, is **DAN H. YOUNG**, author of accompanying descriptive article.

gantry spanning each dock and carrying two 75-ton hooks, will place the heavy loads involved in the construction of the ships. For lighter and shorter lifts there will be at Philadelphia, twelve 20-ton track gantry cranes and three 75-ton revolving cranes which will travel at the edge of the docks.

We scheduled our operations to cut off a year-and-a-half from the time it ordinarily takes to build a dock, and we are now trying to squeeze a little more, for it looks as though we can anticipate our schedule. The remainder of this article describes the work at Philadelphia; the operation of the Norfolk job is different in some details, but is generally similar.

Starting the Job

The contract was awarded on June 26, 1940. The site was cleared and excavation started July 3. The 15-yd. dipper-dredge *Toledo* and the 7½-yd. clamshell dredge *Camden* dredged out a basin extending about 900 ft. back from the Delaware River's bank. The *Toledo*, in one 7-day period, excavated nearly 100,000 cu. yd. The dredged material was loaded into dump scows, towed across the river, and dumped near a suction dredge which in turn pumped the material to the Jersey shore, where it was used for reclaiming land.

The basin for Dock 4 was dredged to



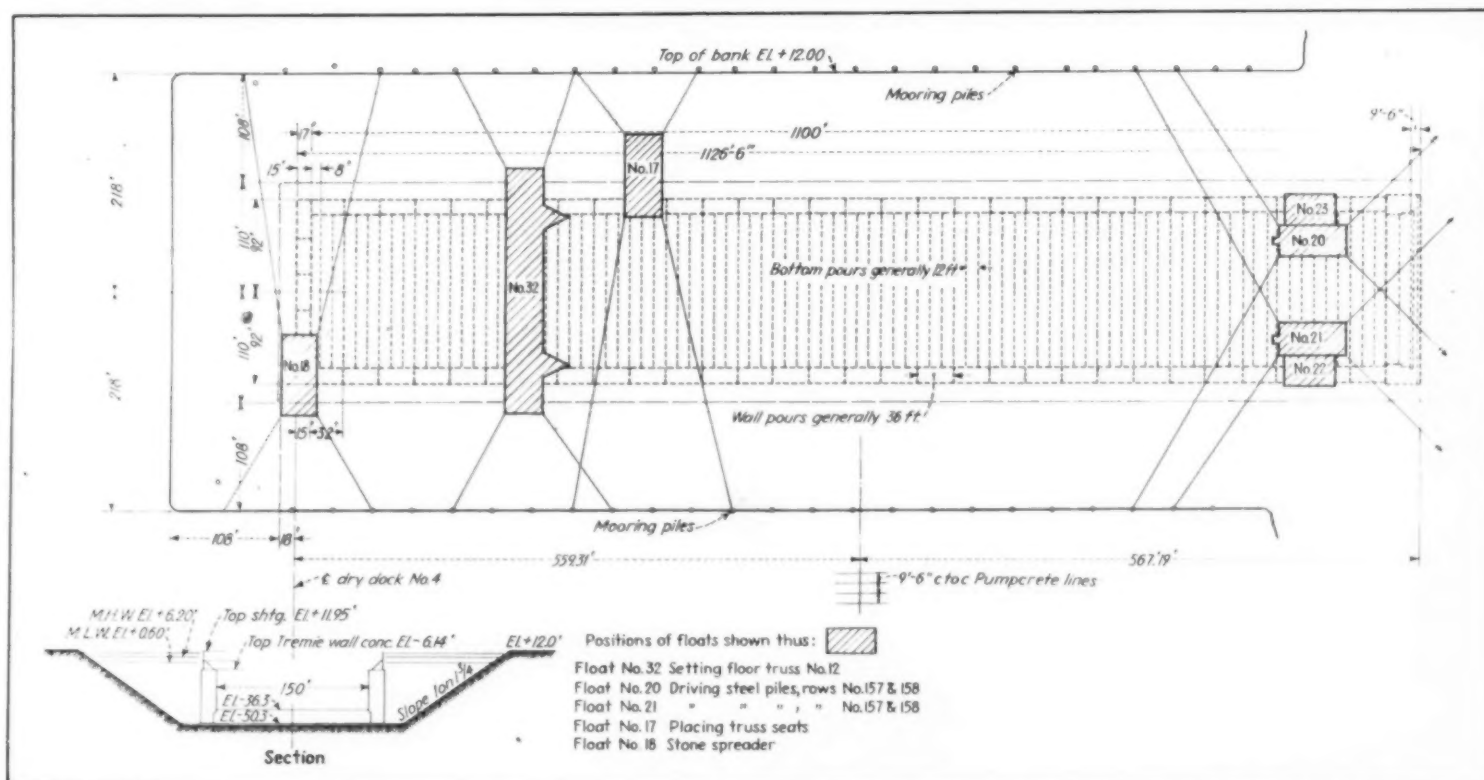
WITHIN AREA OF DREDGED BASIN for drydock floating equipment includes two pile drivers (in background) putting down 60-ft. steel H-piles, barge with two shear-legs (center) placing truss box form for tremie concrete in floor slab, and two derrick boats carrying revolving cranes for handling wall forms and for other uses.

a depth of 53 ft. below low water, 216 ft. wide at the bottom and 436 ft. in width at the top. As this is written, the dredging for Dock 5 is under way. It lies directly west of Dock 4, with 440 ft. between centerlines of the two docks. The top of the slope between the docks will be a common one. The nature of the ground is such that the slopes stand at a ratio of 1 on 1¾, so that piling has not been required around the basin. About 1,250,000 cu.yd. of spoil was removed for Dock 4.

After the dredging was completed, the next step was to cover the entire floor area with a minimum of 2 ft. of crushed stone. The specifications for this stone required that it pass a 3-in. square, and be retained on a 2-in. round, opening. A large drag made of I-beams was used to smooth the excavated floor and when the stone was placed it was leveled off by this drag. This operation of leveling the stone was necessary in

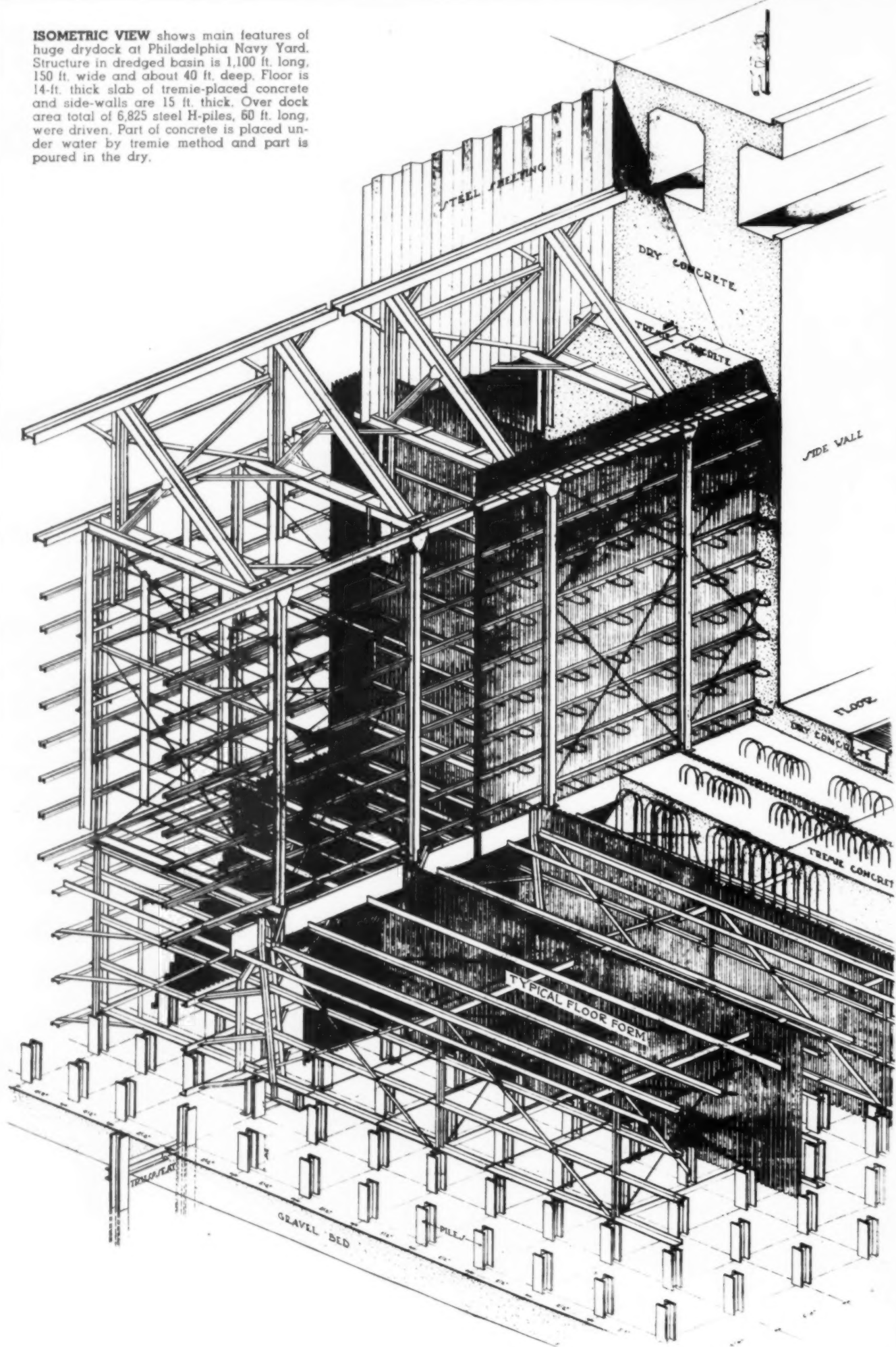


CONTRACTORS' KEY PERSONNEL on construction of Philadelphia Navy Yard drydocks includes: (Back row, left to right, standing) DAN H. YOUNG, job manager; BYRON HUNICKE, planning and equipment design engineer; BILL KEEHN, superintendent of structural steel; BILL DENNY, general superintendent; WILLIAM DE LEON, office manager; HARRY HINKEL, dredge superintendent; GEORGE HOLMES, mechanical engineer; ART RUGE, engineer of Executive Committee. (Front row) JIM DENTON, chief engineer; JACK AROYAN, designer; JOE WIGMORE, chief architect; JOE DURFEE, chief of field parties.



COORDINATION OF FLOATING EQUIPMENT within dredged basin for 1,100x150-ft. drydock is indicated by this diagram of typical day's operations for placing tremie concrete, showing locations (cross-hatched) of: Float No. 32, setting floor truss form No. 12; floats No. 20 and 21, driving steel piles; float No. 17, with revolving crane placing truss seats; and float No. 18, with revolving crane spreading stone for floor base.

ISOMETRIC VIEW shows main features of huge drydock at Philadelphia Navy Yard. Structure in dredged basin is 1,100 ft. long, 150 ft. wide and about 40 ft. deep. Floor is 14-ft. thick slab of tremie-placed concrete and side-walls are 15 ft. thick. Over dock area total of 6,825 steel H-piles, 50 ft. long, were driven. Part of concrete is placed under water by tremie method and part is poured in the dry.





CONTRACTOR'S YARD alongside drydock site contains concrete mixing plant, at extreme left, from which extend four 8-in. pipe lines fed by double Pumpcrete machines, served by three 34E dual-drum mixers. At right, are tops of six 300-cu.yd. aggregate-receiving bins. At left center are newly fabricated steel wall forms and, in rear center, truss forms to be used for tremie concrete in floor slab. Buildings at right are welding sheds where forms are fabricated.

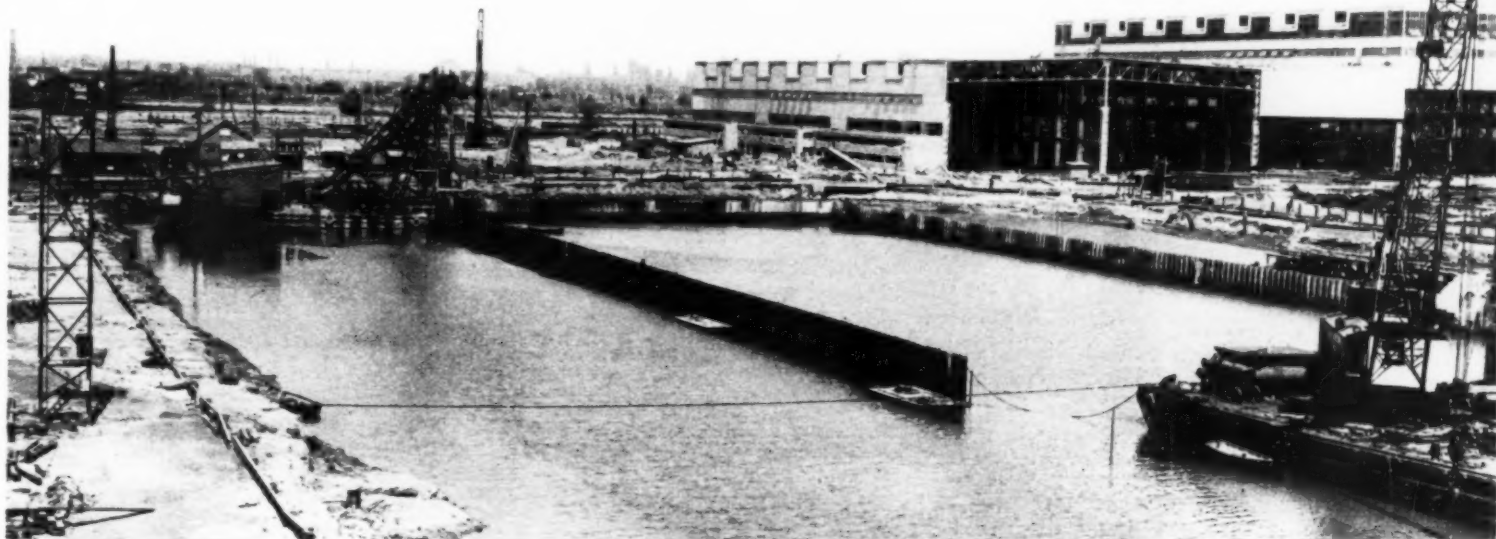


CONCRETE PLANT EQUIPMENT includes 517-cu.yd., four-compartment aggregate bin, bulk cement storage silo, three 34E dual-drum mixers, four double Pumpcrete machines. Overhead belt conveyor transfers aggregates from six 300-cu.yd. storage hoppers. Three 8-in. pipes in foreground convey concrete for floor slab to tremie barge; another 8-in. pipe line (not shown) delivers to wall forms.

order to produce a uniform seat for the steel tremie-concrete forms.

When the stone was graded, three piledrivers were used in driving a total of 6,825 Bethlehem and Carnegie-Illinois steel H-piles. The upper ends of these piles are embedded 3 ft. in the 14-ft. thick concrete floor of the dock. Under the side walls the piles are designed for bearing, but in the center their purpose is to prevent flotation when the dock is empty. These piles, each 60 ft. long and weighing 3,420 lb. were spaced about 6 ft. longitudinally and 5 ft. transversely throughout the

ROW OF STEEL SHEETPIILING outlines walls of drydock. In background, two tremies mounted on barge and fed by pumped concrete are pouring 15-ft.-thick walls in sections 36 ft. long at rate of 60 cu.yd. per hour. Crane on barge at right is placing side wall forms under water. At left is row of 6x12-in. batterboards (used with cable for spotting positions of steel H-piles in floor area) and portable flood-light tower.



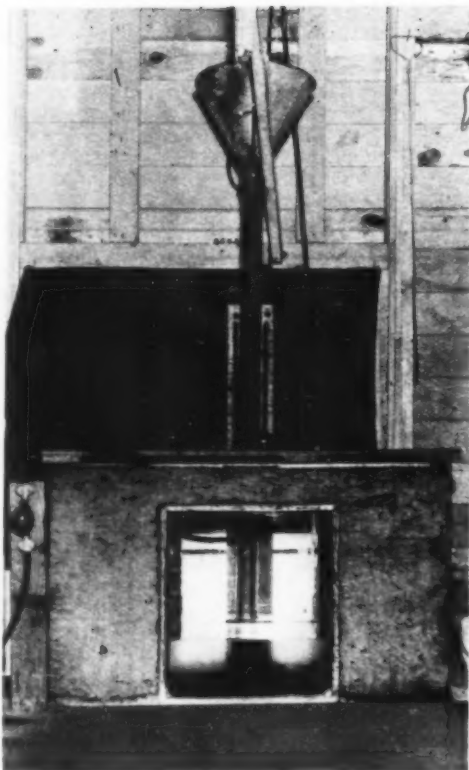
dock floor area. They were driven to a cutoff elevation of -47.3; that is, the point of the 60-ft. pile is 107.3 ft. below low water.

Piles Accurately Spotted

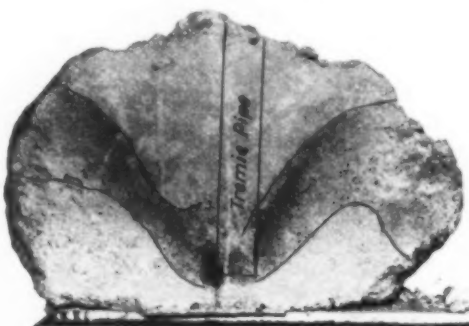
For this pile-driving operation we built steel leads to slide within the standard wooden leads of a floating pile-driver, thus forming, when lowered, the submarine extension of a telescopic unit. To place the pile in this unit the submarine extension was raised clear of the water. The pile was then set in the lead. A hinged gate was pinned closed around the bottom of the pile with the top being held fast in a 20-in. pipe sleeve hung from an 11B3 McKiernan-Terry hammer. The submarine lead was then lowered. These piles had to be driven with a tolerance of not more than 7 in. from their blueprint location.

To get this accuracy there was devised a system whereby 6x12-in. batter-boards extending the full length of the dock were erected on each side. Between these batter-boards at surveyed points a 3/16-in. cable was stretched. This cable was calibrated for sag and had fastened to it a marker for each pile position. There was also another marker which was spotted daily on the center line by instrument. On the front of each pile-driver was hung a working platform with a hole for the submarine lead to pass through. The 3/16-in. cable for locating the piles was placed 6 ft. from the center line of the submarine lead and a plumb-bob hung from this cable was brought over a point on the working platform. This, with the use of a large square, accurately located the pile. The boat was kept trim so that the leads remained vertical.

The whole series of these giant docks will have approximately the same plan



SCALE MODEL with glass front was set up in laboratory to demonstrate operation of new tremie method of placing concrete under water.

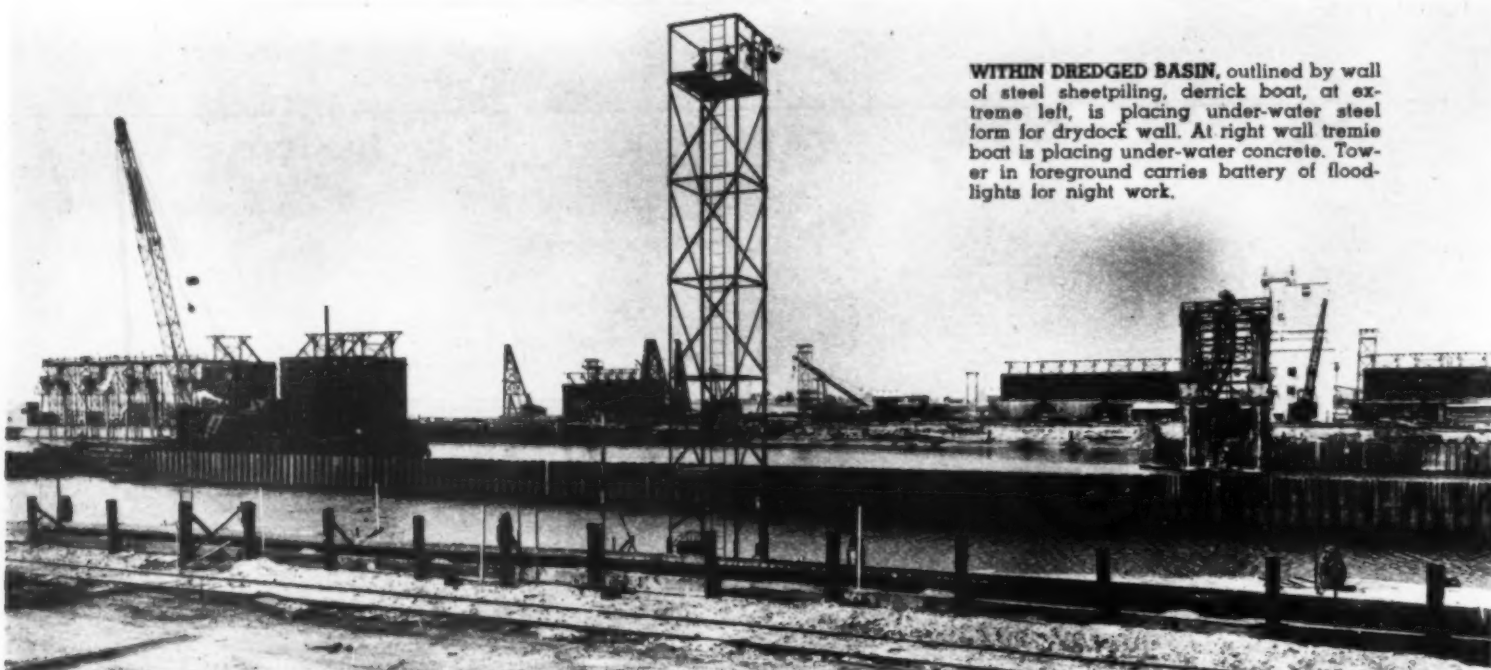


FLOW LINES OF CONCRETE are shown in miniature tremie pour in which differently colored batches of concrete were used to indicate character of spreading action. Poured concrete took form of plumes, one on top of other, with last concrete on top.

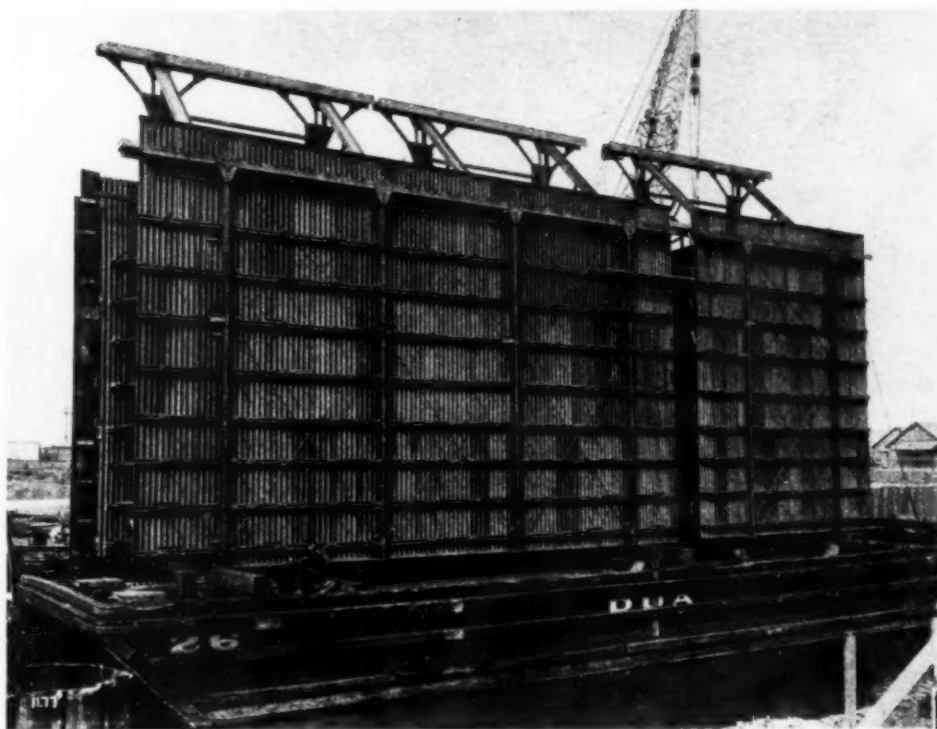
dimensions, that is, 1,100 ft. in length, by 150 ft. inside, and 40 ft. more or less in depth. The thicknesses of the floor slabs vary, depending upon the hydrostatic pressure they have to sustain. The floor slabs of the Philadelphia dry-docks are of tremie concrete 14 ft. thick. The lower portion of the walls is also tremie concrete 15 ft. thick for a height of 44 ft. Embedded 2 ft. in the top of the tremie wall is a continuous 20-ft. bulkhead of Weirton steel sheetpiling which extends 18 ft. above the concrete. This sheetpiling will, when the dock is dewatered, act as a cofferdam to hold out the backfill while the dry concrete work in the side-walls and the floor is being completed. In the floor of the dock a 2½-ft. slab will be placed, with a 2-ft. veneer for the side-walls. Above the tremied side-walls the second lift of the concrete will be placed in the dry, and will contain the pipe tunnels and working gallery for the many utilities required to service the building of battleships. In the 2½-ft. lining in the floor of the dock will be placed the sewerage and drainage systems, and inserts for securing the 500-odd keel blocks necessary to support a vessel.

To facilitate early keel laying a temporary cofferdam, 860 ft. from the head of the dock, is being erected. This will permit the Navy to start construction on the middle portion and stern of the ship, which involve the most difficult and long-time work. A cofferdam will be built around the caisson gate seat at the outer end of the dock for the completion of this portion of the work. When the caisson gate has been placed, the temporary bulkhead will be removed, and the remainder of the dry concrete will be placed to finish the inside of the dock.

Three 54-in. pumps, with the capacity of unwatering either dock in 2 hr., will



WITHIN DREDGED BASIN, outlined by wall of steel sheetpiling, derrick boat, at extreme left, is placing under-water steel form for drydock wall. At right wall tremie boat is placing under-water concrete. Tower in foreground carries battery of floodlights for night work.



SIDE WALL BOX FORMS, in 36- and 24-ft. panel lengths, are built of corrugated steel sheeting with steel channels, back to back, as walers and 1 1/4-in. bolts as tierods. Largest panels weigh 30 tons. At extreme left, with battens in horizontal position, is gate that makes closure between two forms when placed under water.



TRUSS BOX FORM FOR TREMIE CONCRETE in floor slab of drydock is being lifted off transport scow by shear-legs on adjoining barge. Flag poles on ends of form are used to guide alignment and elevation.

be placed in an underground pumphouse between the two docks.

For tremie concrete floor forms a design was prepared on the basis of pouring sections 12 ft. wide across the dock. The result can be accepted as a form for reinforced concrete of the following dimensions: 12 ft. wide, 14 ft. high, and 184 ft. long. The form was designed as a self-supporting, two-point pick-up box truss, with the chord members of the truss acting as a part of the reinforcing. Additional reinforcing, consisting of angles and 2 1/4-in. square bars,

was welded to the box truss in proper positions. The inside face of the box truss was lined with 3 1/2-in. corrugated sheeting manufactured by United Steel Fabricators, Inc., of Wooster, Ohio. The complete form, with all reinforcing attached, weighed from 80 to 130 tons. This difference in weight is due to modification in the design to provide for carrying drainage systems and end forms.

The structural steel trusses were purchased semi-fabricated in three paired sections. These sections were unloaded from cars and placed in a horizontal po-

sition on special trucks. The trusses were then covered with the corrugated sheeting and the entire unit was moved into a special welding building, where the corrugated sheeting was spot-welded to the truss units. This spot welding was accomplished by using specially designed Taylor-Winfield pulsating-resistance welders, commonly known as the "woodpecker system." Two welding sheds were placed side by side so that a pair of units, after being welded, would arrive in the erection bay parallel to each other and opposite hand. The erection crew then would stand the paired units in a vertical position on two 12-ft. gage track dollies placed 150 ft. apart, and on two temporary supports, thus forming the sections. Three sections next were welded together to form a box. Lincoln d.c. arc welders were used in assembling the forms and fixing the reinforcing.

As the assembled box moved the 300 ft. to the launching pier, additional crews placed the bracing, the form ties, and the reinforcing steel, all of which were entirely welded. The completed box

was then taken over by the tremie-truss-placing-crew. The tremie-truss-placing unit was a revamped car float with specially designed shear-leg derricks placed on each end of the boat and 150 ft. apart. This hoisting and placing unit was used to lift the completed form from the launching dock to a scow. The box then was towed to its location in the dock where the shear-legs placed the form below water in its final resting position. Two divers were used in the placing operation of these truss

(Continued on page 98)

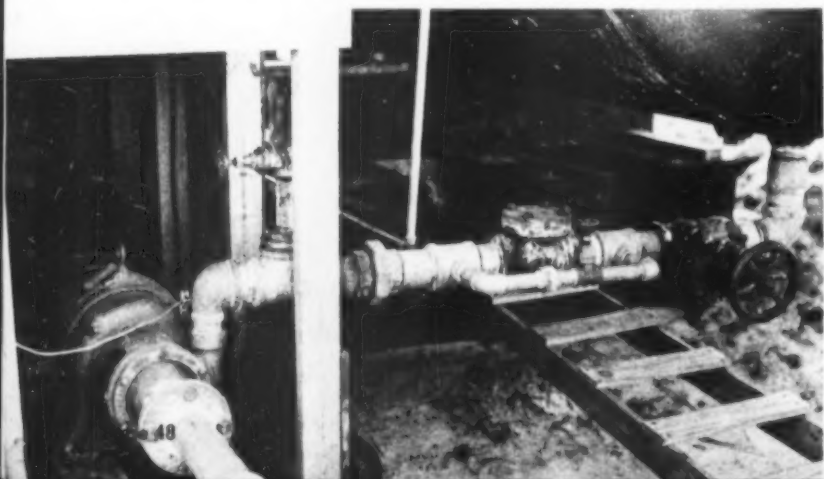


BATTERY OF 80 WELL POINTS hooked up to 6-in. header pipe and 8-in. centrifugal pump lower groundwater level 18 ft. to permit construction in dry of pumping station No. 2, which will deliver all collected sewage from camp through 10-in. cast-iron force main to sewage treatment plant 4,000 ft. away on other side of air field.

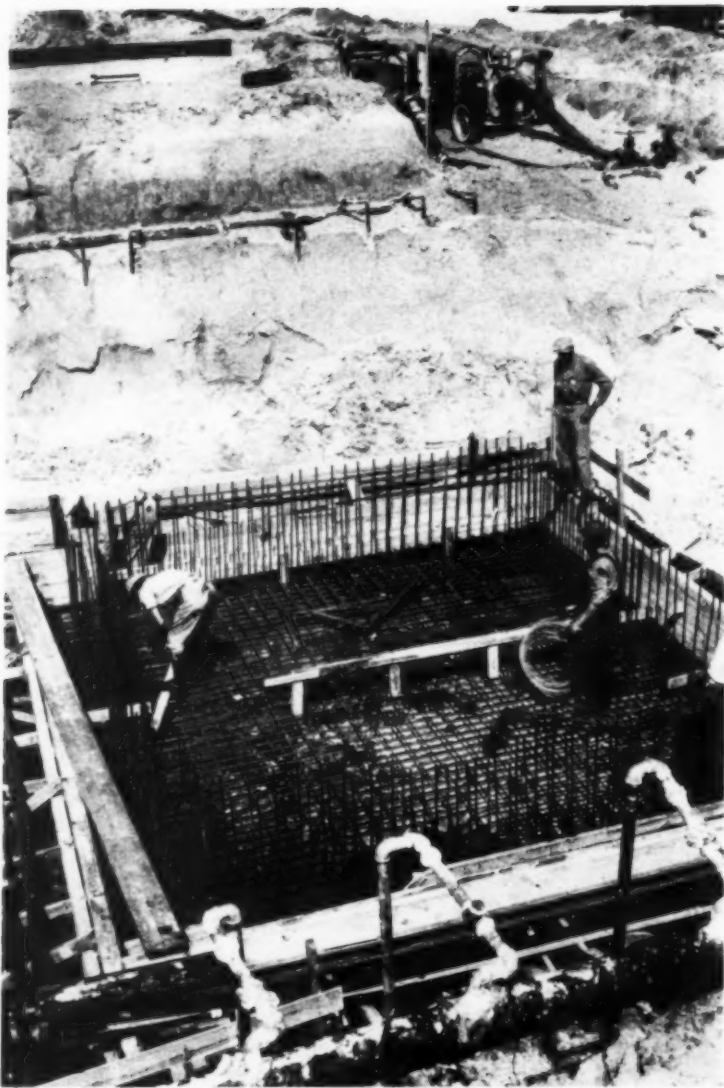


TO DRILL 30-IN. HOLE 135 to 140 ft. deep for water well, Stevens Southern Corp., subcontractor, Jacksonville, Fla., operates this portable plant, including mud pump at left, which supplies slurry for mudding walls of hole. Well calls for 18-in. steel pipe casing with 18-in.-diameter screen about 20 ft. long at bottom. Hole around screen is back-packed with gravel, and remainder of hole is filled with mixed gravel and fine material.

TEMPORARY WATER SUPPLY (below) for construction purposes is drawn by contractor from 6-in. cased well 143 ft. deep capable of supplying about 200 g.p.m. Pump driven by 10-hp. electric motor feeds water into 6,000-gal. tank at right; pressure in this tank is maintained between 40 and 60 lb. per square inch by small air compressor (almost hidden in background) driven by 1/2-hp. motor.



Well Points



PUMPING STATION No. 1, designed to pick up sewage from portion of camp area and deliver to pumping station No. 2, is constructed in dry excavation after 13 days pumping by well points connected through header pipe and hose to 8-in. centrifugal pump.

CONDITIONS TYPICAL OF THE FLORIDA COASTAL REGION—flat terrain, porous, sandy soil and a high groundwater table—faced Watt & Sinclair of Florida, Inc. and Cleary Bros. Construction Co. in building a \$2,000,000 Air Corps cantonment under cost-plus-fixed-fee contract for the War Department at the West Palm Beach Army Air Field. Skilled in their respective fields of buildings and heavy construction, the merged construction firms were well qualified to undertake the various kinds of work involved in a complete camp, with its wide range of utilities and structures. Experience in predraining wet, sandy soil proved particularly valuable in the construction of the sewer system.

By operating 1,600 ft. of 6-in. headers and 200 ft. of 4-in. headers, with well points at 30-in. spacing, the contractors with two 8-in. centrifugal and several smaller pumps predrained sewer trenches up to 9 ft. deep, 7 1/2 ft. below groundwater level, and made it possible for three gangs to lay as much as 1,400 ft. of vitrified clay sewer pipe, 6- to 12-in. size, in a single 8-hr. day. As a result of the pre-

PREDRAIN SEWER EXCAVATION FOR AIR CORPS CANTONMENT



WATER MAINS for entire 3½-mi. distribution system are constructed of asbestos-cement pipe. Groundwater comes close to surface.



ARCH-SECTION CORRUGATED METAL PIPE is employed for drainage culverts to save height in shallow clearance between water table and ground surface, particularly under street crossings. Water main here passes under culvert.



STORM DRAIN of salvaged 36-in. corrugated metal pipe is relaid in air field to take part of apron and runway drainage. Gradient on this line is 0.2 per cent, drop being about 1 ft. in 520-ft. length of pipe.



CRAWLER DRAGLINE backfills air field storm drain with material handled from spoil bank into trench.



GRADING FOR STREET, small dragline handling ¾-yd. bucket on 45-ft. boom strips sand soil to shallow depth.

LIME ROCK FOR STREET PAVING (below) comes to job in trucks, which dump material for spreading to 8-in. loose depth by tractor-bulldozer.



THREE-WHEEL FLAT ROLLER (below) compacts 8-in. loose depth of lime rock to 6 in. Surface then is given two applications of asphalt and chips, either pea limestone or slag.





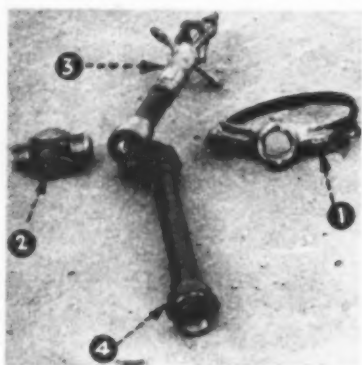
U. S. ENGINEER OFFICE in barracks building on job overflows to second story where ceiling has typical lining of gypsum board. Air ducts lead from warm-air furnace, necessary even in southern Florida.

draining, trenches could be cut with vertical banks requiring only skeleton sheeting and bracing to hold them in place. To speed predraining, well points were moved ahead at night. In all, the contractors laid 2.7 mi. of vitrified clay sewers. Where the lines crossed under roads, vitrified clay pipe in sizes up to 8 in. was incased in concrete; for 10-in. and larger sizes, cast-iron pipe was substituted.

To hold sewer trench excavation to the maximum depth of 7½ ft. below water level, Solomon & Keis, engineer-architects, Fort Lauderdale, Fla., designed for the camp a sewer system incorporating two sewage pumping stations. Sewage from a portion of the camp flows to pumping station No. 1, where it is picked up and delivered to pumping station No. 2, which also collects sewage from the remainder of

(Continued on page 109)

Step-by-Step Field Methods . . . TAPPING A WATER MAIN



1 COMPLETE EQUIPMENT to tap water main and make service connection consists of: (1) pipe saddle and U-bolt; (2) corporation cock; (3) pipe-tapping device containing inner drill bit designed for turning by hand wrench at upper end of drill rod, and (4) service pipe stem for connection to corporation cock.



2 TO TEST THREADS of pipe strap and corporation cock, workmen assemble parts at rear end of truck before installing unit on water main. Rubber gasket is used under galvanized saddle to make tight fit with water main.



3 RATCHET WRENCH on drill stem of Mueller pipe tapping machine turns bit penetrating asbestos-cement water main as second workman screws down head of machine to maintain pressure on drill bit. Same type of machine serves also for tapping steel and cast-iron mains either empty or under pressure.



4 WITH TAP COMPLETED, drill is retracted from hole to permit pipe tapping device to be unscrewed from corporation cock. As this main is empty, it is not necessary to shut off corporation cock before disconnecting machine.



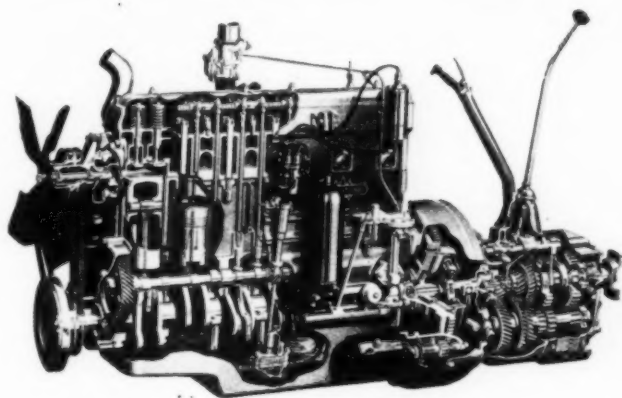
5 COMPLETED SERVICE TAP, with pipe stem coupled to corporation cock, is ready for pipe connection into nearby building.



THREE ESSENTIALS FOR DEFENSE come out of shops of single manufacturer as Chrysler Corp. adds 31-ton medium tank to Dodge commercial and four-wheel-drive army trucks produced by its factories

JOB

oddities



TRUE PERSPECTIVE of cutaway truck engine emerges after six weeks' work by International Harvester Co. artist using series of photographs and 500 blueprints to produce three-dimensional view giving layman X-ray insight into heavy-duty valve-in-head Model FBC unit.



IT'S WASH DAY in Midtown Tunnel when New York City Tunnel Authority puts this washing machine through tube to clean 500,000 sq.ft. of glass tile in walls and ceiling. Manufactured by Mack Trucks, Inc., tank-trailer combination has separate compartments for soap solution and clean water. Auxiliary engines drive pump and air compressor which supplies air to operate scrubbing brushes.



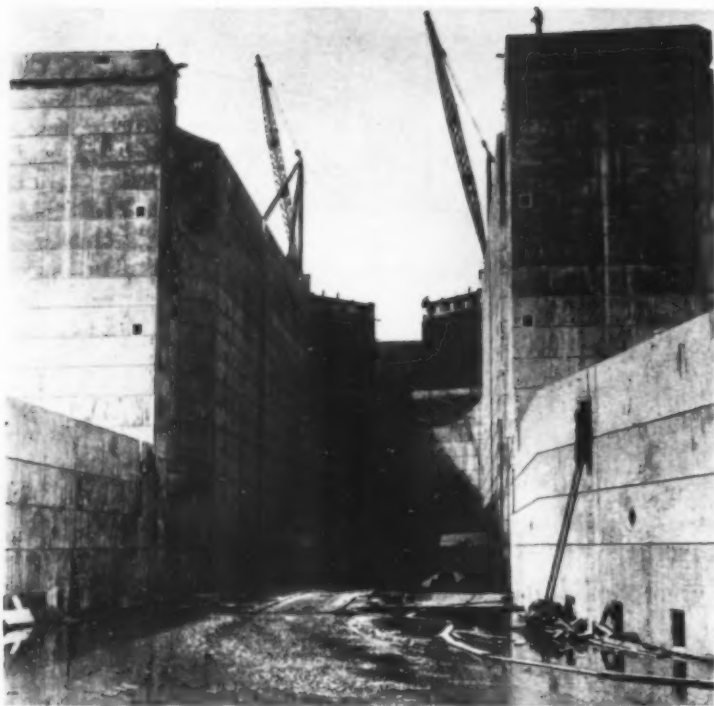
DESERT DEFENSES at Tobruk, beleaguered British-held port in Libya, employ miniature concrete pyramids set in double rows to form tank traps.

British Combine Photo



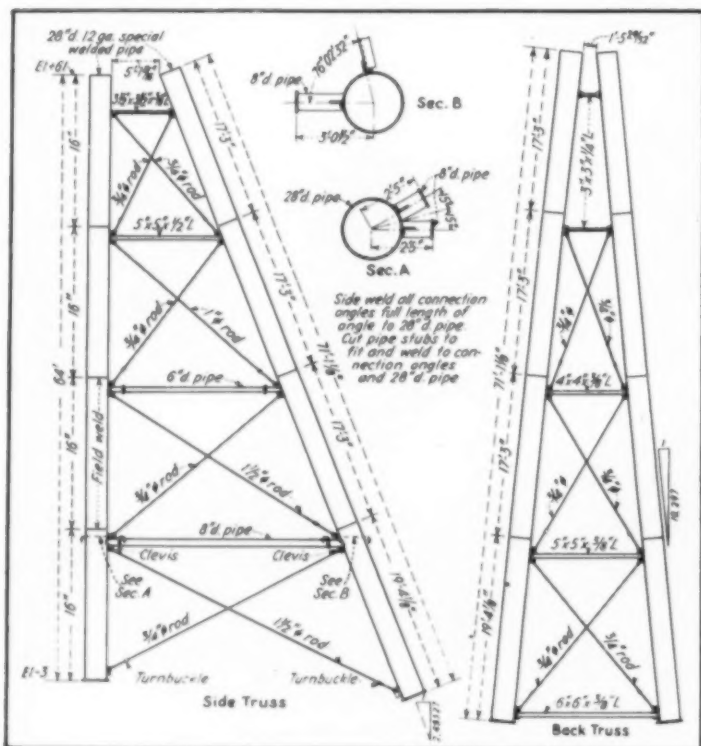
WOMEN APPLY MAKEUP to macadam roads in England, replacing men as spray operators and stone spreaders.

British Combine Photo



NAVIGATION LOCK with world's highest single lift, 75 ft., approaches completion at Pinopolis as upper lock gate and emergency gate are assembled by two stiff-leg derricks.

Tower Framing Supports *Steel Shells* For Tall Concrete Columns



STEEL PIPE FORMS for group of three tall reinforced-concrete columns are erected in 16-ft. vertical lifts made self-supporting by temporary tower bracing installed between legs.

BY USING STEEL PIPES for column forms and installing tower bracing between the plumb and batter legs in each column group, the Central Engineering Co., Davenport, Iowa, simplified construction of 26 cast-in-place reinforced-concrete piles 64 ft. high which support the upper guard wall above the navigation lock at Pinopolis Dam of the South Carolina Public Service Authority's Santee-Cooper project. Pipe sections and tower framing were built up in successive 16-ft. vertical lifts to facilitate setting of reinforcing steel and placement of concrete in the 28-in.-diameter forms.

An accompanying sketch indicates the completed tower structure for a typical three-column group. It will be noted that the tower framing is designed to make each lift of forms self-supporting as erected. Original plans for the columns contemplated stripping the forms from the concrete, but no objection was made to the contractor's proposal to use the self-supporting forms and to leave the steel pipe in place on the columns, removing only the struts and diagonal stays.

With the exception of two columns (one plumb and one battered) at the outer end of the wall, the piles are arranged in groups of three, made up of one vertical and two counterfort legs. Spiral-welded steel pipe was prefabricated in standard lengths for 16-ft. vertical lifts with angle flanges and stubs for the cross-bracing welded to the pipe walls. Circumferential joints in the column forms were welded as



REINFORCED-CONCRETE COLUMNS incased in spiral-welded steel pipe support navigation guard wall 63 ft. above foundation and 48 ft. above reservoir bottom.



GUARD WALL 250 ft. long and 20 ft. high rests on 26 steel-shell reinforced-concrete piles, of which 23 are visible in this view.



REVOLVING STEAM CRANES handle materials for steel frame and reinforced-concrete intake piers of power house. Corrugated metal pipe 6 ft. in diameter, at right, provides temporary conduit for stream through wall between power house and navigation lock. Concrete mixing plant appears in left background.

successive pipe sections were erected. A steam Whirley crane with a 100-ft. boom lifted buckets of concrete into position to fill the forms.

At the base, the piles are supported in reinforced-concrete pedestals bearing on limestone foundation rock. The piles extend about 25 ft. below the surface of the ground. At the top they project 1 ft. into the reinforced-concrete guard wall.

To support the forms for the reinforced-concrete guard wall, 20 ft. high by 6 ft. wide by 250 ft. long, the contractor erected timber bents on 36-in. centers resting on a mat of 2-in. plank laid on the surface of the ground, which was soft and somewhat spongy. As a result of the close spacing of the bents and the use of the plank mat, the wall was constructed

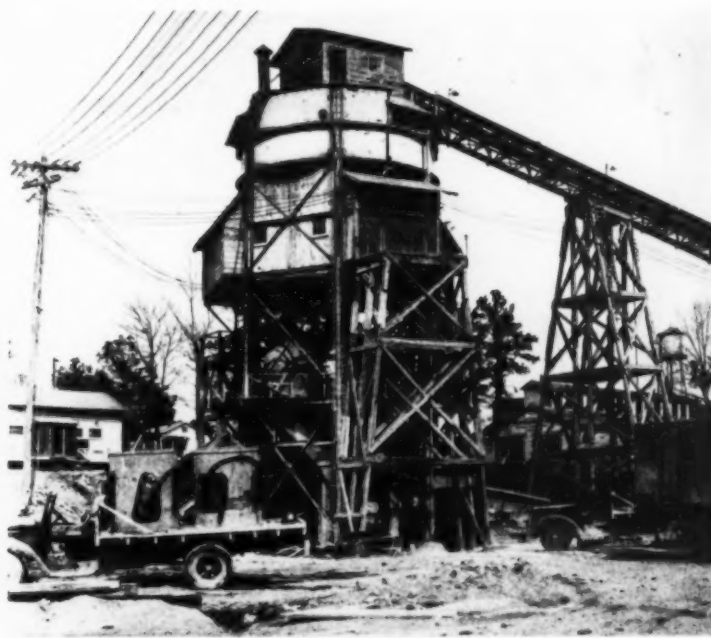
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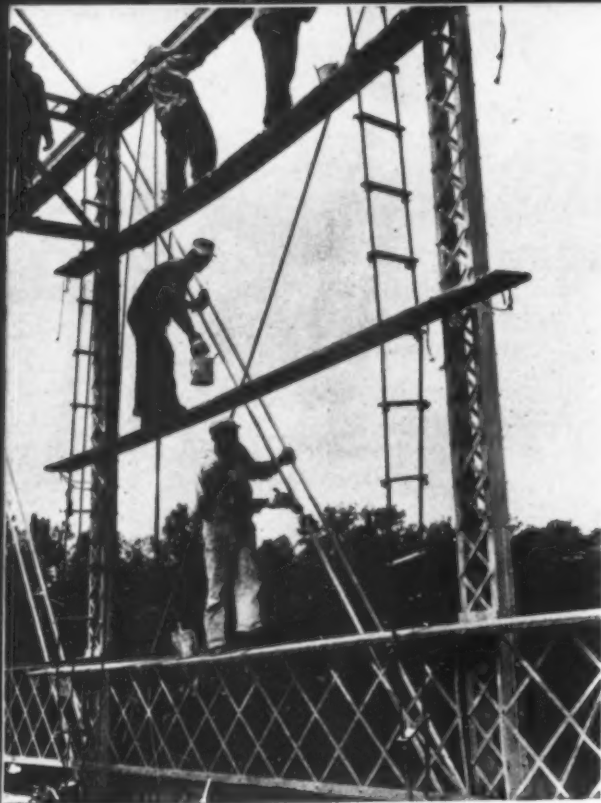
CONSTRUCTION OPERATIONS on three contracts of Central Engineering Co. are directed by A. E. COSENS (left), general superintendent, standing with G. W. McCRADY, erection engineer in charge of setting three turbines installed by Allis-Chalmers Mfg. Co.



POWER PLANT provides space for six hydraulic turbine-generator units, five of 40,000 hp. each and one of 13,500 hp. Initial installation includes four large units and single small unit.



CONCRETE PLANT equipped with two front-end-charging 2-yd. tilting mixers is able to turn out more than 100 cu.yd. an hour. Flat-bed trucks haul concrete buckets to cranes. Lock and powerhouse require about 200,000 cu.yd. of concrete.



SEAMAN'S RIGGING of Jacob's ladders supports scaffold planks used by WPA painters on bridges in Wapello County, Iowa. Special steel hooks, adjustable to fit any size girder, fasten hanging ladders to bridge chords.

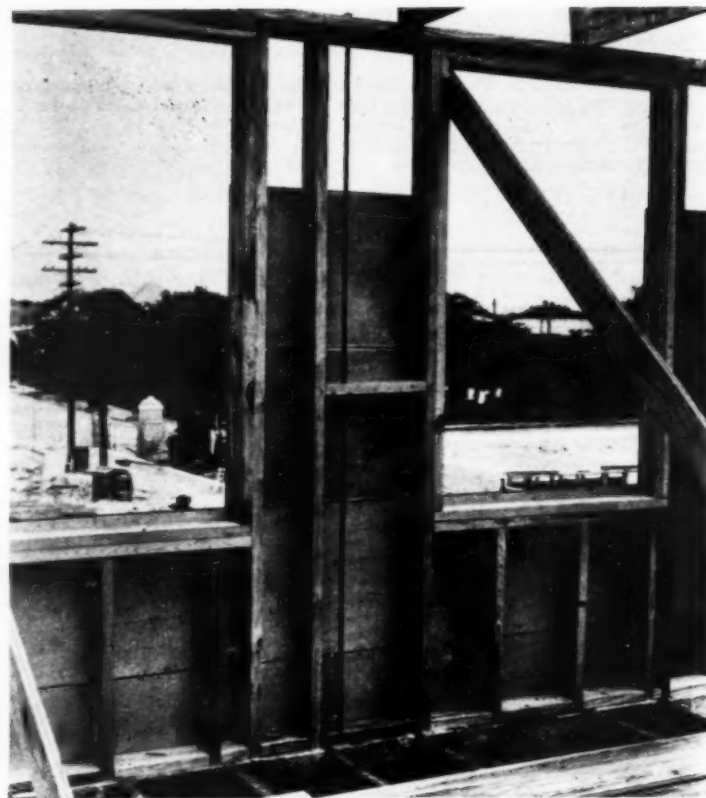


CLIP ANGLES (above) containing holes for temporary bolted connections prove effective in assembly, prior to arc welding, of 128 curved steel plate sections, 7/16 in. thick, for 57-ft.-diameter spherical gas storage tanks in Cleveland, Ohio. After all steel for a horizontal tier of the tank was erected and held in place by bolts through the clip angles, tack welds were made at various points, followed by finish welding of the inside seams with Lincoln shielded-arc equipment. All welding was done by Gas Machinery Co., of Cleveland.

HOW *They Did It*

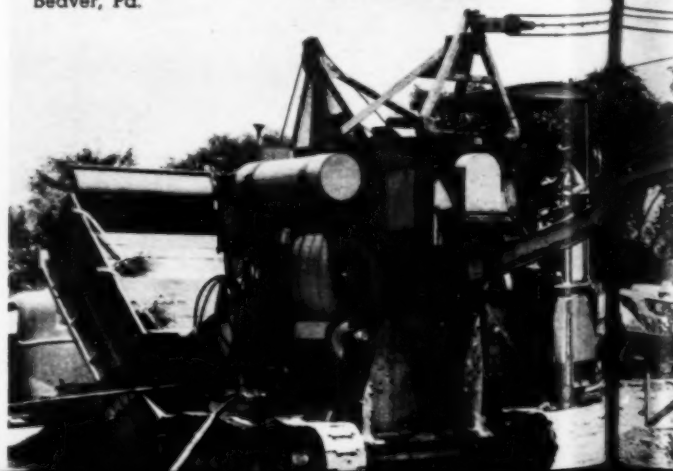
CONSTRUCTION DETAILS *For* *Superintendents and Foremen*

SERVING AS TRACTOR to pull elevating grader, powerful Caterpillar motor grader is hooked up to second unit when side-casting or truck-loading is required by road crew of Precinct 3, Matagorda County, Tex. Ordinarily motor grader is used for normal operations of road construction, ditching and general maintenance.



HURRICANE RODS tie wall plates to concrete foundations of two-story wood-frame building erected by The W. P. Thurston Co., Richmond, Va., as part of its contract at Key West, Fla., Naval Station. Rods are 3/4 in. round, spaced an average distance of 15 ft. apart; they are welded to anchor rods embedded in foundation walls. Wall sheathing of fiber insulating board, with t. & g. horizontal joints, has aluminum-painted inner surface to reduce radiant heat transmission and asphalt-coated outer face and edges to stop moisture penetration.

INCLINED BOOM on MultiFoote 27E paver permits Hughes-Foulkrod Co., contractor, Philadelphia, Pa., to place concrete from paver bucket directly in wall forms at Curtiss-Wright plant, Beaver, Pa.





DETACHABLE BIT SORTER, devised by Robert E. Welch, master mechanic, is used at Carlton Tunnel, Cripple Creek, Colo., to segregate dull drill bits according to length, instead of gage alone, before sharpening by milling for re-use. Sorter consists of two pieces of angle-iron welded on flat base to form inclined channel slightly more than $2\frac{1}{8}$ in. wide—length of new bits—at its upper end. Width of channel decreases uniformly to $1\frac{1}{2}$ in. at lower end, this being length of bit milled down until it is too short for further use. Space between top and bottom of tapering channel is laid off in six sections, each about 6 in. long, marked to indicate bit length, from $1\frac{1}{4}$ in. to $1\frac{3}{4}$ in., in increments of $\frac{1}{8}$ in. Lengths of sections conform to varying gages of used bits, which are rolled down channel, one by one, are retained in section which indicates gage, and are then dropped into barrels marked with respective sizes. Bits under $1\frac{1}{4}$ in. fall into discard barrel. Two men sort 1,100 bits, representing 24 hr. of drilling, in half an hour.

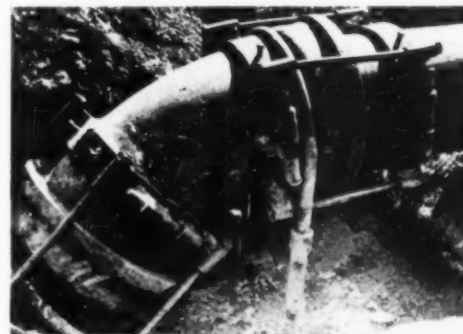
Photo, Thos. J. Barbre



EXCAVATION IN THE DRY for foundation of 19-story Prudential Life Insurance Building in Newark, N. J., is made possible by installation of Moretrench well-point system to lower ground-water level in cut, which was taken out by power shovels to depth of 30 ft. On three sides of rectangular pit sheeting was eliminated and banks

stood at 1:1 slope; on fourth side near existing buildings sheeting and shoring were employed. Concrete piers to support columns of building are built within pits from 8 to 10 ft. square sunk to depth of 35 ft. and sheeted. George A. Fuller Co. is general contractor, and Thomas Crimmins Contracting Co. is subcontractor for substructure.

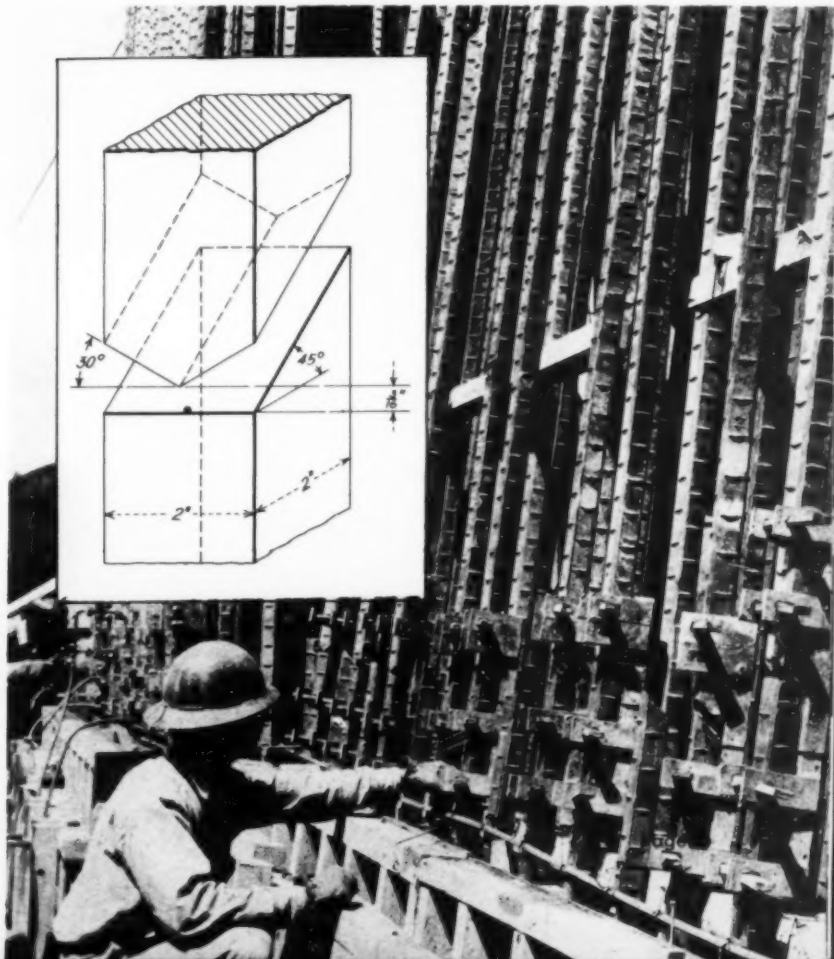
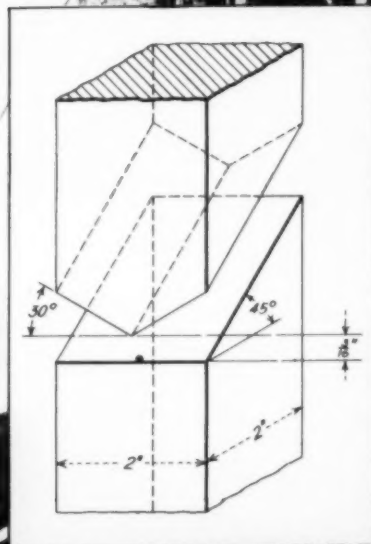
SHORT-BODY BEND (right) of 45 deg. in 12-in. Acipco mono-cast Enameline cast-iron pipe, employed for water and sewerage systems at Camp Wheeler, Macon, Ga., is insured against leakage under severe pull by clamps installed as illustrated. Fitting at point where pipe comes out of 4-ft. trench is anchored by $1\frac{1}{4}$ -in. U-bolt embedded in concrete block.



SCREW ANCHORS of transmission line type 5 ft. in length are installed on 20-ft. centers in soil-cement parking apron to tie down planes at U. S. Army Air Field, Tallahassee, Fla. Ivy H. Smith and S. S. Jacobs Co., Jacksonville, are contractors for airfield under supervision of U. S. Engineers.

SPECIAL CLAMPS (below) lock 2-in. square reinforcing bars in position, indicated by inset drawing, for welding in piers of Pitt River bridge, Calif. Gas burners, barely discernible in background, preheat adjacent bar ends to about 500 deg. F. prior to electric welding by operators of J. K. Welding Co., subcontractor for this work under Union Paving Co., contractor for U. S. Bureau of Reclamation.

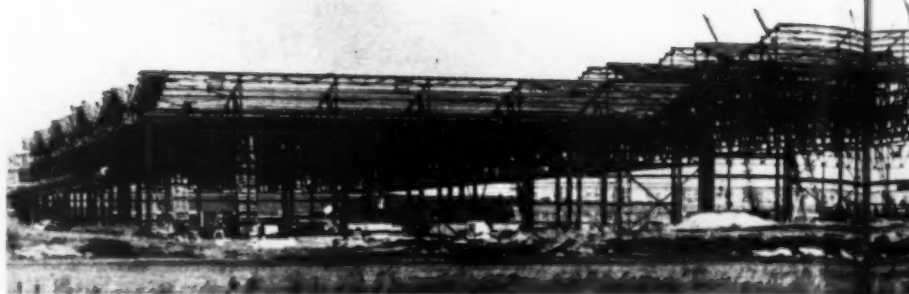
Photo, U. S. Bureau of Reclamation



Winter Construction



Sets Fast Pace on 10-Acre Aircraft Building



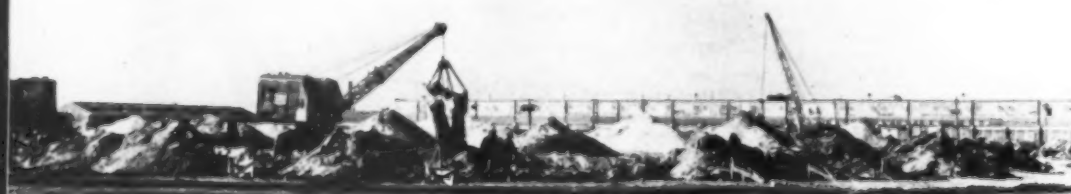
SIX CRAWLER CRANES with booms projecting above roof framing erect 4,700 tons of structural steel for 10-acre building in 22 working days. Five small derricks on roof, at left, are set up to hoist sheathing lumber.



ON TWELFTH WORKING DAY after entering site, contractor has completed concrete footings in 100x500-ft. basement far enough ahead to permit start on erection of forms for columns, walls and first-floor slab. Note wire-mesh tracks to provide runways for heavy concrete mixer trucks in sand soil.

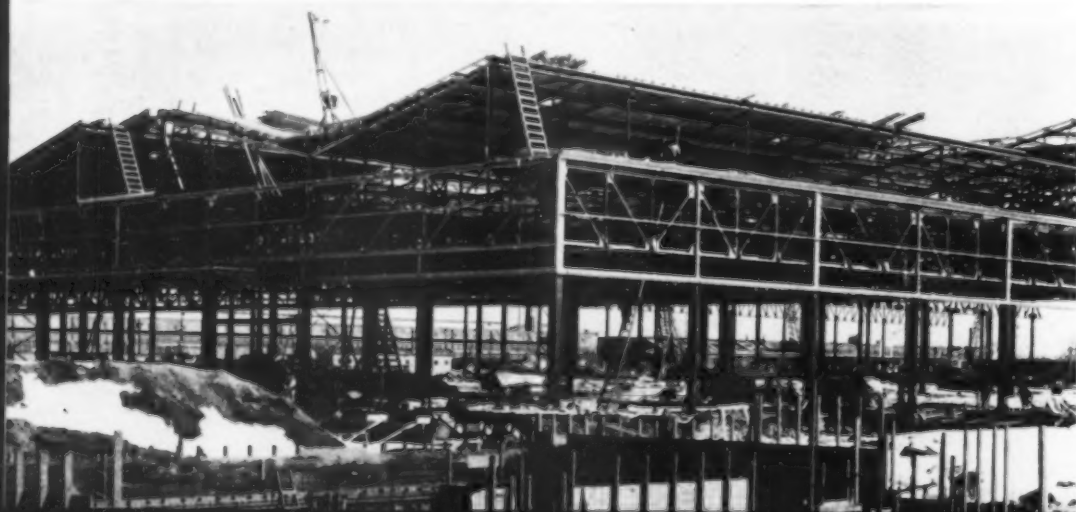


JOB SUPERVISION rests on broad shoulders of: (left to right) LARRY E. GILMORE, superintendent, Turner Construction Co.; M. L. (Bob) CARPENTER, foreman, Bethlehem Steel Co.; PAUL W. BEST, superintendent, Albert Kahn Associated Architects and Engineers, Inc.; WILLIAM LUKACS, construction inspector, U. S. Army Air Corps; and A. J. KELLY, field supervisor of construction, Republic Aviation Corp.



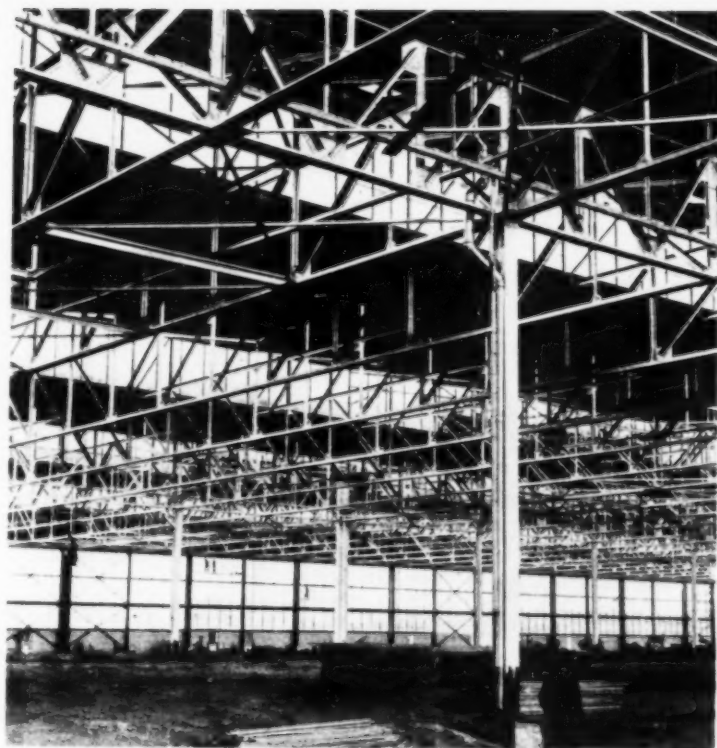
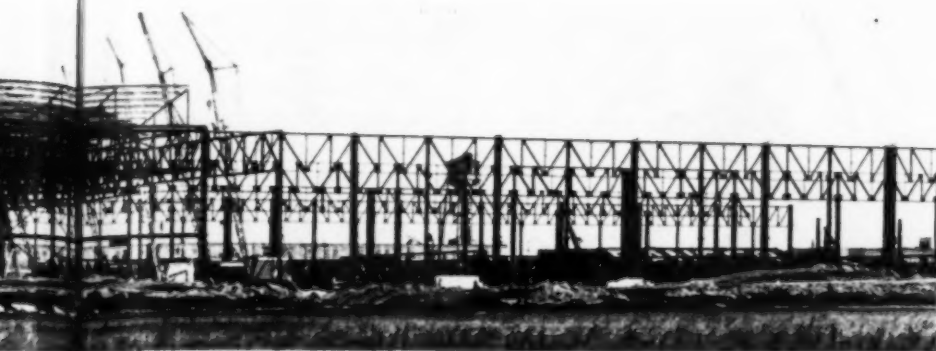
CLAMSHELL CRANES dig pits for footings and for underfloor transformer and toilet rooms of aircraft manufacturing and assembly building, covering more than 10 acres of floor space.

FOR FAST HOISTING OF ROOF SHEATHING (below) contractor employs A-frame derricks equipped with hand winches which are operated by portable electric drills.



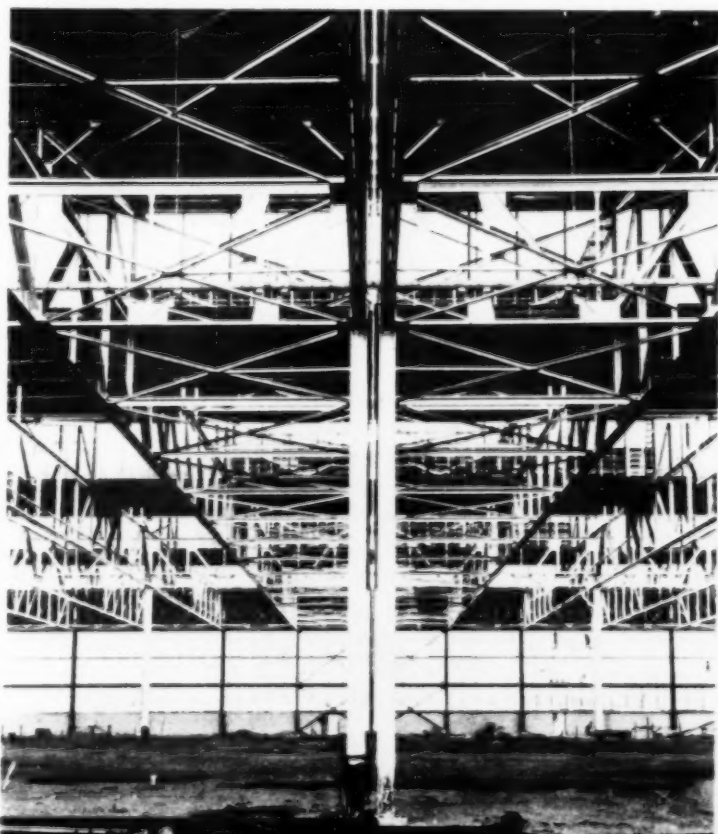
GETTING AWAY TO A FLYING START

during the second week of January on the construction of a 10-acre aircraft manufacturing and assembly building for the Republic Aviation Corp., at Farmingdale, L. I., N. Y., the Turner Construction Co., general contractor, and the Bethlehem Steel Co., separate contractor for the steel framing, rapidly pushed completion of excavation, foundations, frame and roof deck in the first twelve weeks on the job and finished the erection of all structural elements for the inclosure of the building by the end of April. Awarded the contract on Friday, Jan. 3, the construction firm on the following Monday put to work at the site one power shovel, three clamshell cranes and three tractor-scraper outfits; these excavators in 7 days of continuous 24-hr. operation moved 40,000 cu.yd. of sand-gravel material and permitted concreting to start on the eighth day in a 500x100 ft. basement section at one end of the 10-acre building, measuring 500x900 ft. in its overall dimensions. During the next 10 days the



ROOF DRAINS are connected into pipe leader coming down steel column to tile sewer under floor. Insulated water lines are suspended in roof trusses of building.

EXPANSION JOINT SEPARATES (below) main section of building into two independent units. Note trussed bays in roof and wall framing on both sides of joint.

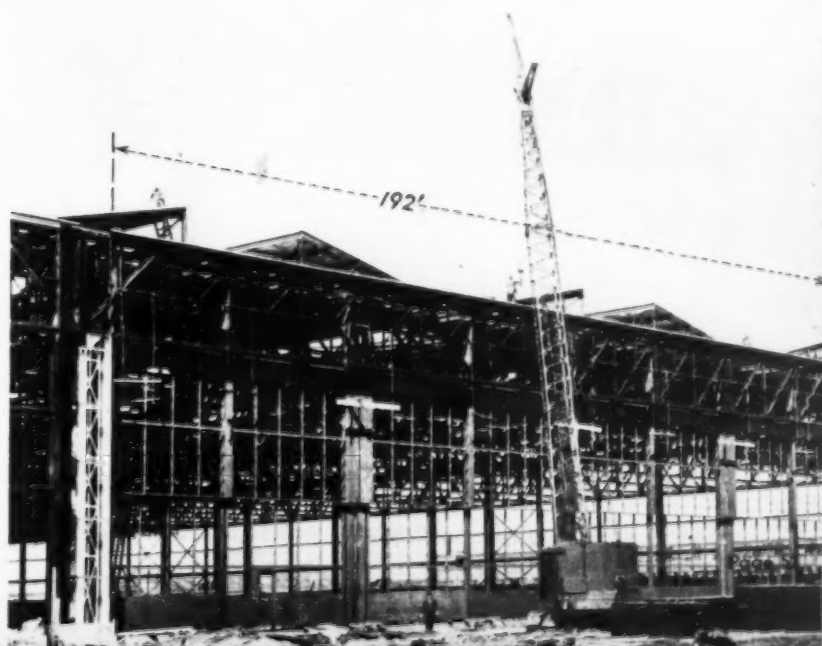


MONITOR FRAMING to height of more than 60 ft. is erected above roof trusses with aid of jib on boom of crawler crane.



AIRCRAFT MANUFACTURING AND ASSEMBLY BUILDING 900 ft. long by 500 ft. wide has tile wall below, and Gunite curtain above, horizontal band of steel sash. Upper curtain of east wall, in foreground, is constructed of protected metal sheets to facilitate future extension of building.

CANOPY DOOR (below) with total horizontal clearance of 192 ft. is made up of four independently controlled units each 48 ft. wide.





TRUCK MIXER delivers concrete to foundations of airplane weighing scales inside building.



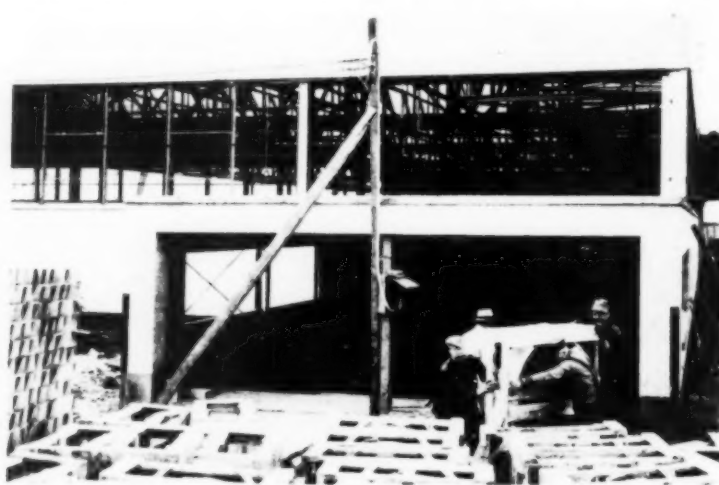
E. J. MURPHY superintendent for Brennan and Sloan.

clamshell cranes completed digging the pits for the remaining miscellaneous column footings and underfloor vaults of the building.

Formwork, setting of reinforcing steel and placement of concrete proceeded rapidly in the basement section in the face of intermittent severe weather conditions during January and the first half of February. At the end of five weeks the contractor had completed placement of 3,000 cu.yd. of concrete in the footings, walls, columns and first floor slab of the 50,000-sq.ft. basement section. During this period the concrete crews also placed the bulk of 1,000 cu.yd. required for other footings on the site and completed the last of these footings one week later, on Feb. 20. Concrete was delivered to the forms at a minimum temperature of 60 deg. F., and was kept warm during the curing period with tarpaulin inclosures and coke-burning salamanders.



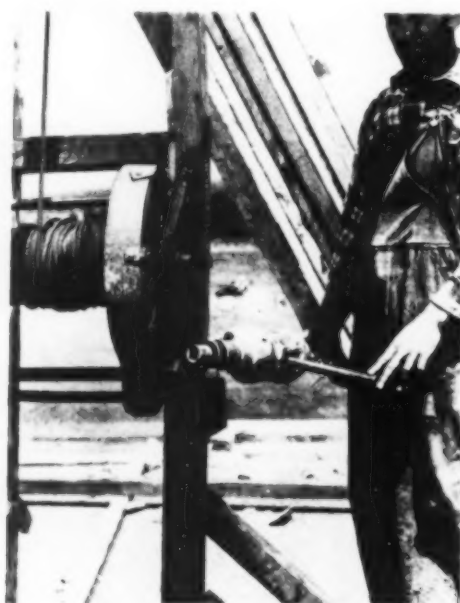
NON-GLARE GLASS, blue in color, to reduce heat transmission, is used in west, south and east elevations of building. Truck mixer delivers concrete to loading platform alongside railroad track.



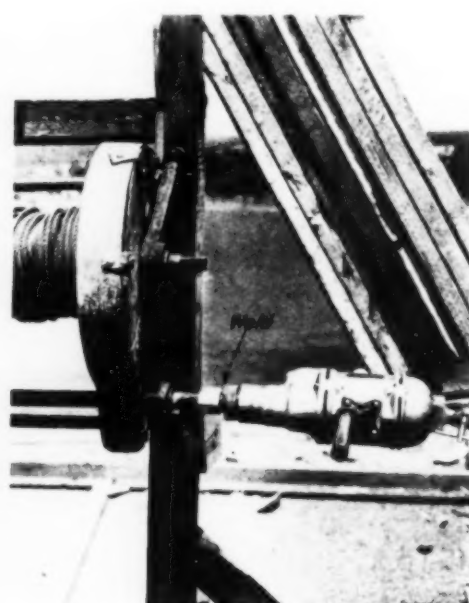
COVERED OUTSIDE STAIRWAYS leading down to locker rooms in basement section provide employee access to building.



ELECTRIC DRILL drawing power from 1,800-w. portable generator is equipped with special socket to operate winch on A-frame derrick hoisting lumber to roof. When raising roof sheathing each of these drill-operated derricks hoists normal load of twelve 2x6-in. by 14-ft. fir or pine pieces.



SQUARE SOCKET welded to drill spindle fits over end of pinion shaft on hand winch.

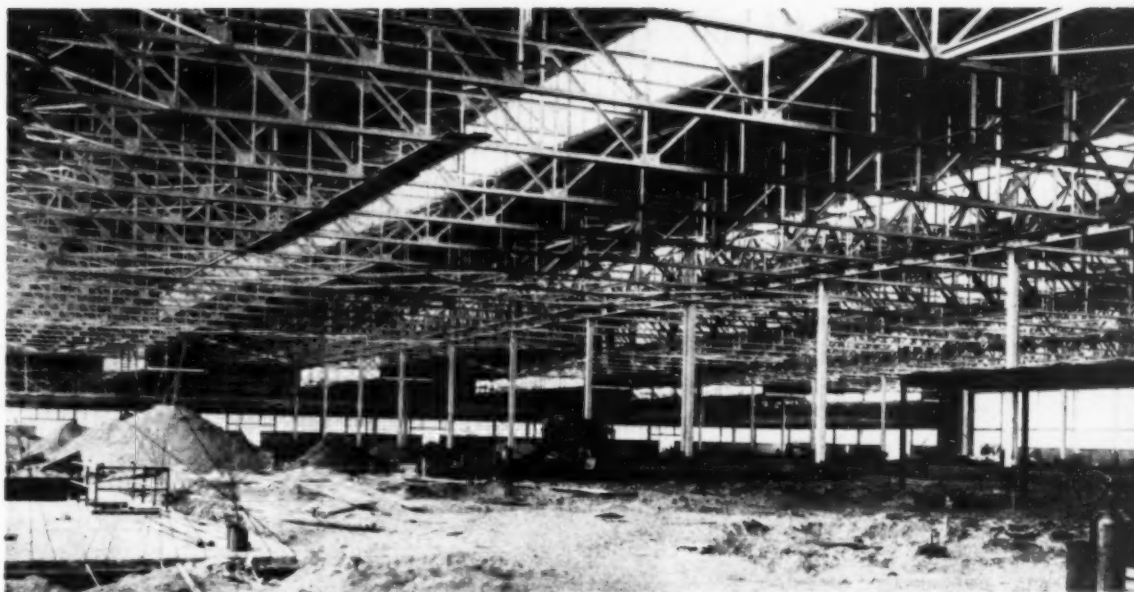


FOR TROUBLE-FREE OPERATION, socket is welded to removable drill spindle. This construction gives uninterrupted service in contrast to unsuccessful method first tried of using drill chuck to grip shank of separate socket-and-shank unit.

By the close of the fourth week of concreting the Bethlehem Steel Co. was able to start erection of steel frame over the basement section adjacent to the railroad spur track on which shop-fabricated steel was delivered to the job. The steel contractor erected the 4,700-ton frame of the 900x500-ft. building in seven weeks, beating the scheduled steel completion date by three weeks despite 13 days lost because of bad weather.

Following closely on the heels of the ironworkers, Turner began to apply 2-in. wood roof sheathing early in the fourth week of steel erection. Four weeks later, at the end of the twelfth week on the job, the wood roof deck was completed, permitting interior work in the building to go forward without fear of interruption by storms. Rapid completion of the four primary construction steps: excavation, foundations,

(Continued on page 88)



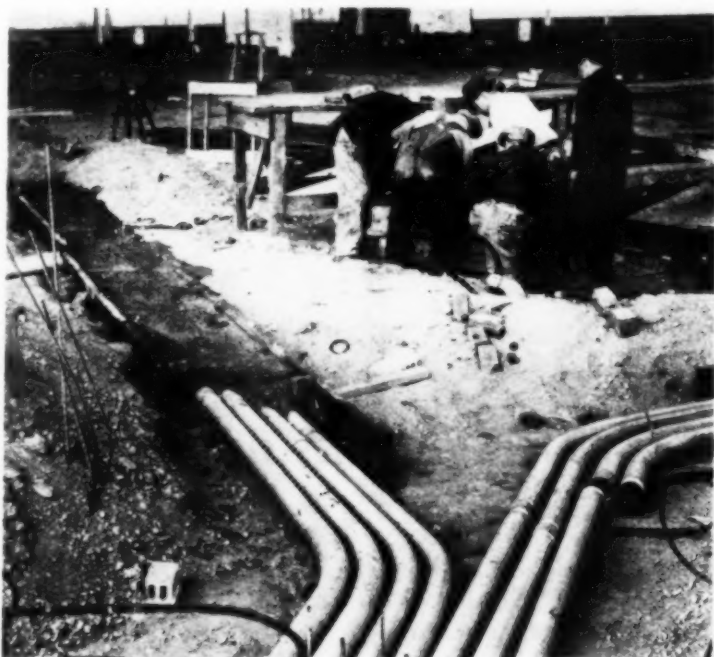
SIDE BAYS 150 ft. wide flanking 200-ft. center bay make up 500-ft. width of building's main section, 750 ft. long. At left is concrete slab covering toilet and transformer room. Black steel frame, at right, will carry monorail conveyor for handling aircraft engines.



TO NEUTRALIZE ALUMINUM PAINT SPOTS before applying cement floor topping on rough-surface slab over basement section, workman douses slab with 1 to 10 caustic soda solution.



AFTER CAUSTIC SODA TREATMENT, rough slab is thoroughly washed with hose streams at 250-lb. pressure.



FROM TRANSFORMER ROOM galvanized steel underfloor conduits incased in concrete lead out to panel boxes for electric power distribution.



MACHINE-FINISHED HARD-SURFACED FLOOR receives three hand trowelings as final operation following use of power roller and floats in preceding stages of construction process.

POWER THAT

ON *Every* JOB!



"WM" TRACTOR AND HOUGH SHOVEL

This specially-engineered dirt-moving team consists of the 32 h. p. "WM" Tractor and Hough Shovel with 1/2-yard capacity bucket. Bulldozer blade is interchangeable with bucket.



"AD" MOTOR GRADER

Powered with a 75 h.p. 2-cycle DIESEL engine, this versatile unit handles heaviest construction work with ease, yet offers accurate, easy control for fine grading.



TRACTOR CRANES

Shown here on the "IU" tractor, this handy crane is also available for the "WK", "WM" and "IB" tractors. Working loads range from 1500 lbs. for the "IB" unit to 8,000 lbs. for "WK" and "WM" sizes.

Today's highball construction schedules call for power equipment that can deliver the highest possible output per hour of work; equipment that gets to work quickly, stays on the job and gets more done. ● Check up on your job to see where modern, up-to-date equipment can help you step up schedules and reduce costs. Yesterday's finest power equipment may be seriously inadequate for today's job... a handicap you can avoid by checking up NOW. ● Shown here are types of Allis-Chalmers machines engineered to meet today's requirements. Your Allis-Chalmers dealer will gladly show you where and how they can do your job faster, at lower cost.

ALLIS-CHALMERS

TRACTOR DIVISION • MILWAUKEE • U. S. A.

T R A C T O R S — E N G I N E S —

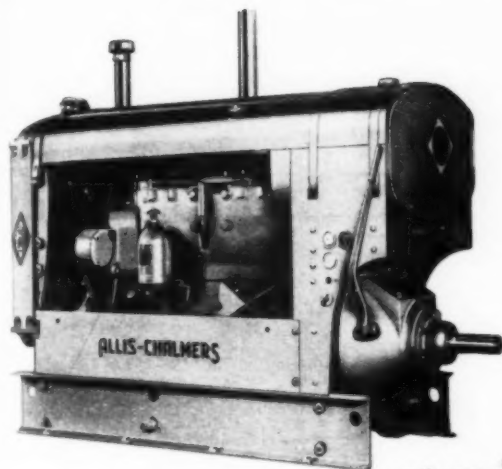
"WM" and Hough Shovel saves time on a sewer construction job.



"IU" and Roustabout handling timbers for Stone-Webster at Electron, Wash.

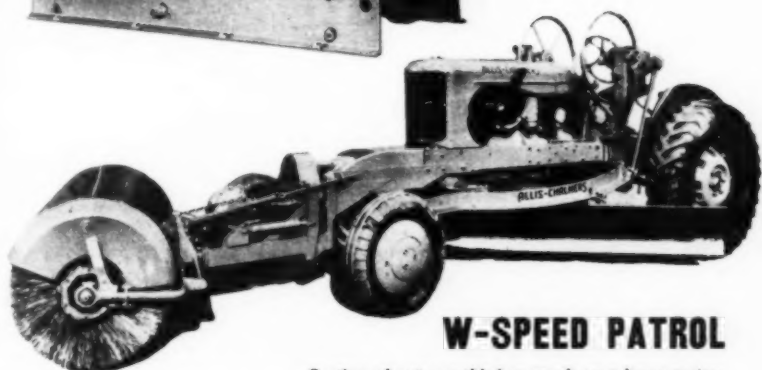


IT PAYS



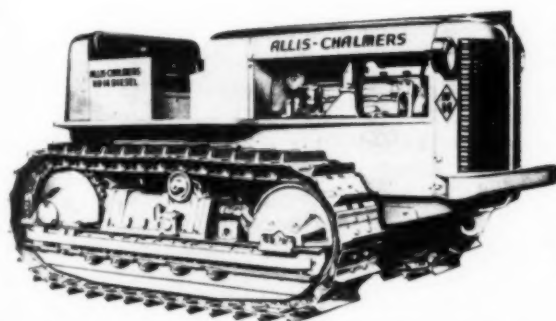
POWER UNITS

Allis-Chalmers builds five sizes of Power Units from 19 to 110 h. p. Cost is extremely low; various clutch, outboard bearing arrangements and mountings available in standard types.



W-SPEED PATROL

Costing about one-third as much as a large motor grader, this husky patrol will maintain up to 5 miles of road per hour on a gallon of fuel. Handles ditching and light construction as well as maintenance. Power broom (illustrated), highway mower and snow plow available.



2-CYCLE DIESEL TRACTORS

HD-7, HD-10, HD-14
60 to 132 d.b. h.p.

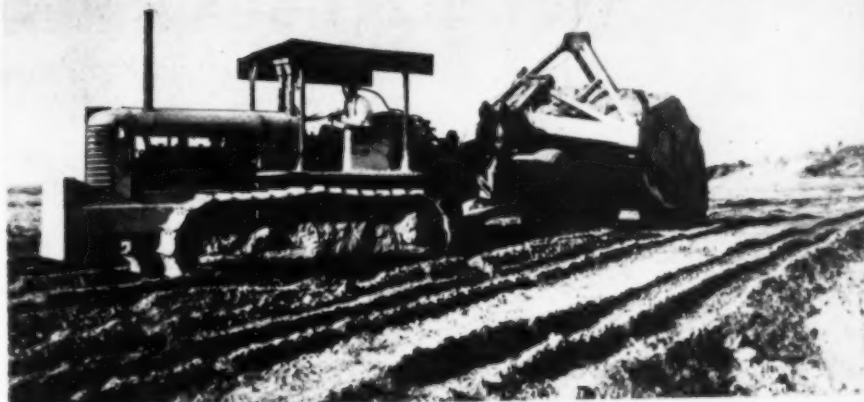
Have instant electric starting, 200-hour truck wheel lubrication, bi-metallic clutches and brakes. Deliver outstanding performance in heavy construction and logging operations.

S-POWER

ROAD MACHINERY

.. IT DOESN'T
COST ..
it Pays!

HD-14 and cable 'dozer clearing way for building construction, Airport cantonment for U. S. Army Air Corps at Portland, Ore.



Parker-Schram speeds work with this HD-14 and Gar Wood cable scraper on their Oregon Ship-building Corporation job.



Accurate bank trimming with new AD Motor Grader.



E-60 Power Unit runs this gravel plant near Bremerton for the Washington State Highway Department.

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ALLIS-CHALMERS MFG. CO., Tractor Division, Milwaukee, Wisconsin.

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- ☐ 86-h. p. HD-10
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- ☐ Industrial Wheel Tractors

- ☐ Allis-Chalmers Power Units
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- ☐ AD Motor Grader
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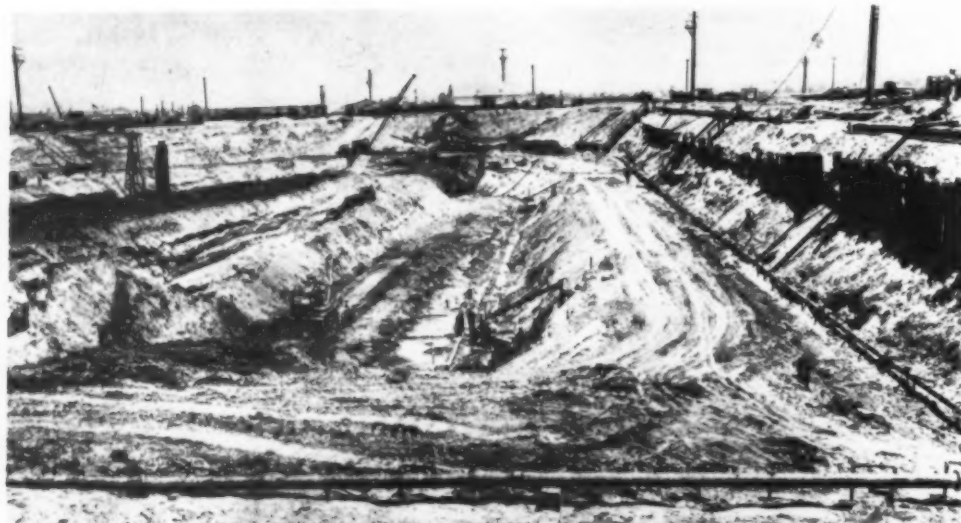
Company _____



NAVY DRYDOCK AREA

Drained With Well Points

TO ELIMINATE COSTLY COFFERDAM



GRAVING DOCK for Navy at San Diego is being excavated in dry behind protection of some 1,500 well points operating in two and three depth stages.



DRILL IS HALFWAY DOWN, casing in previously drilled hole is being filled with gravel via chute from berm to funnel in top of casing.

THE NAVY needed a cruiser graving dock at San Diego; time was an important factor and the Pacific Bridge Co., with much experience in placing foundations below water level, was called into consultation and given a fixed-fee contract. In view of the national emergency and the need for speed, it was decided that good strategy called for banking on the experience of the contractor in the rather bold plan to make a 400,000-cu.yd. excavation with

the aid of well points alone and without waiting to construct completely around the dock some form of cofferdam such as ordinarily would be a preliminary to excavation on this scale in soft material at the water's edge. As the dimensions required would be about 134x720 ft. and the depth approximately 56 ft., it was estimated that an inclosing cofferdam might cost as much as half a million dollars. Instead, a small earth-filled dike, rein-

forced with wood and steel piling (estimated to cost \$50,000) was built around the seaward end of the dock. This kept out the sea while well points drew down the water table to such an extent that the entire excavation could be made in the dry.

How well this plan has succeeded is indicated by the accompanying pictures showing the unwatered sides of the excavation standing on slopes as steep as 1 to 1 1/4. Well points are here being



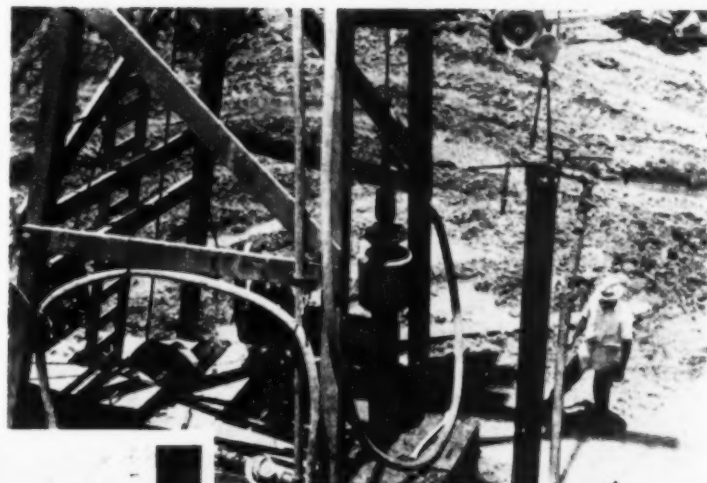
TRENCHES were excavated by draglines; risers were put down and connected to headers along which half-couplings had been welded on at 2-ft. intervals. Note pump in background with discharge pipe leading over embankment.



AFTER UNWATERING, sides of excavation stand on slopes as steep as 1 1/4, indicating considerable percentage of clay content, a feature unfavorable to well-point operation. A 20-ft. berm beside headers is used by trucks and cranes.



STOPCOCKS in connections between risers and header are adjusted frequently so that each well point functions effectively.



DRILL, in center, is being turned by engine-driven rotary drill rig. At right, 8-in. well casing is being put down in hole just drilled.

used in several depth stages and excavation is being carried, in parts of the work, as deep as El.—56.

The strategy by which this battle was won, in the opinion of the contractor, was in the layout of the well-point system. Well points were supplied and their installation was supervised by the John W. Stang Corp., New York. This equipment uses a special type of centrifugal pumping unit, aided by a vacuum pump operating as part of the unit and displacing 60 cu.ft. of free air per minute. This design provides a suction to maintain continuous water inflow, regardless of varying proportions of air and water. With this system there is no interruption of pump operation while the entire area within reach of each well point is being unwatered, or at least while ground water is held down to desired levels with pumps discharging at a rate equal to that of water infiltration into material around the excavation. Each pump unit is arranged to work



CUTTING EDGE of bit on bottom of drill is fish-tail with central opening through which water under pressure is forced.

without interruption; the gasoline supply is taken from drums delivered to cradles near the engine, connected so that a new drum can be cut into the supply line without shutting down. Similarly, crank-case oil is changed without interrupting operations simply by draining out the old and pouring in new oil with the engine running.

Three Pumping Stages

It was obvious from the start that two or more stages would be required in the pumping. The first stage, put down from an elevation of 10 ft. below sea level, has risers extending 21 ft. below this level. This length of riser is considerably more than that ordinarily used. The first operation was to excavate a trench, by means of a dragline, in which to lay the header. On the inner side of the trench a 20-ft. berm was left for the operation of trucks and cranes. Then the well points were put

(Continued on page 105)



PUMP UNIT includes vacuum attachment which helps maintain continuous flow whether rate be large or small. Old sheet piling (above) was put down in 1917 and is not part of this job.



DISCHARGE LINES from each pump deliver into large steel pipes flanking excavation on either side. Crawler cranes are used extensively for handling pipe and other materials.

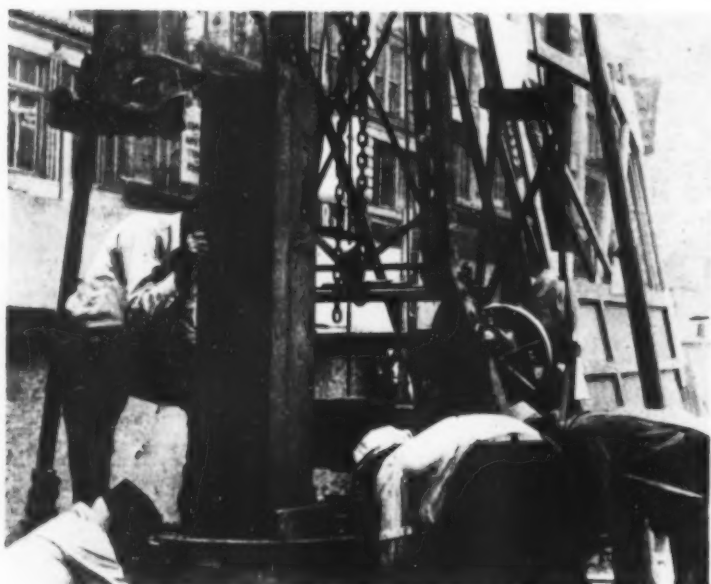
Drill Rig AIDS DRIVING OF LONG VERTICAL H-BEAMS



PORTABLE DRILL RIG has 25-ft. steel tower for operating auger and lifting steel beams.



AS AUGER LIFTS load of sand out of 20-in. hole, board is put over opening to prevent any dropped material from falling back into hole.

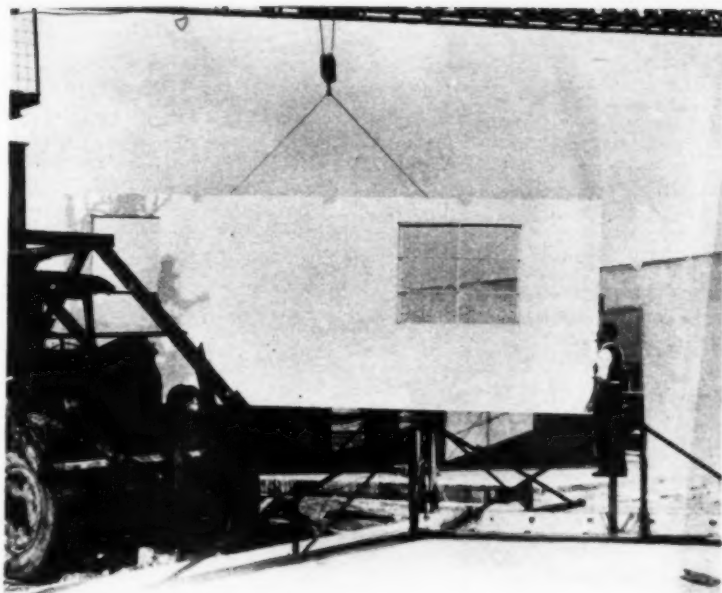


STEEL BEAM is lowered into hole after the auger has finished and before drill rig moves ahead.

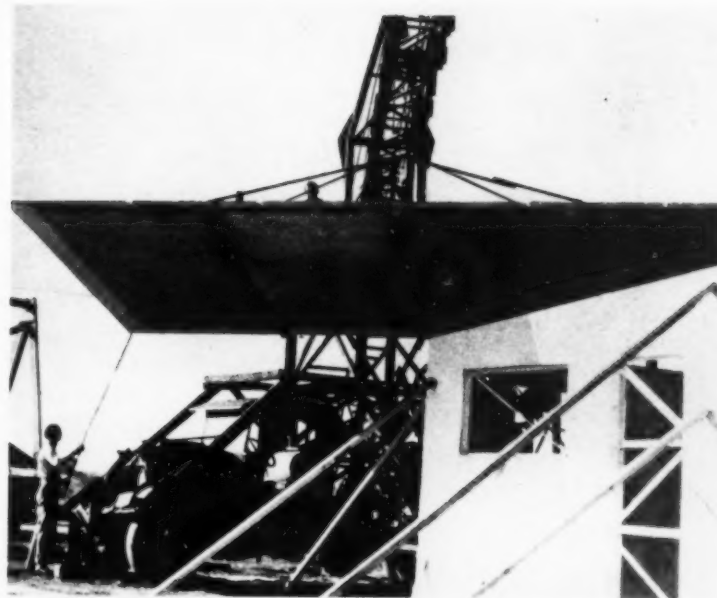
TWELVE-INCH STEEL H-BEAMS weighing up to 60 lb. per foot and ranging in length up to 60 ft. are being put down vertically on 9-ft. centers around the entire periphery of an excavated area in Union Square at San Francisco where a 4-story underground garage is being built to occupy an entire city block. As the excavation is to be 48 ft. deep and the square is entirely surrounded by buildings, some quite tall, an effective shoring system is required.

To set up the beams for driving, a portable well drilling rig specially developed for this type of work is used by I. P. Tikiob of Walnut Creek, Calif. This rig employs an auger to dig the holes and has a steel tower 25 ft. high which guides the auger and also functions as a gin pole or derrick for hoisting and placing the steel beams. Holes are put down to a minimum of about 36 ft.

Front wheels on the drill rig are quickly detachable to permit bracing the chassis with jacks. An automobile engine provides power for rotating the auger and for the winch used to hoist the steel beams. The auger is suspended from the tower by a shock-absorbing device which raises the drill when an obstruction is encountered. The entire drilling outfit weighs about 2½ tons. Contract for construction of the garage is held by McDonald & Kahn, San Francisco.



PRECAST WALL UNIT is set by crane which operates as close as 10 ft. to building. Note horizontal boom.



CONCRETE ROOF SLAB is placed on precast walls previously erected by special crane with horizontal boom.

Precast Concrete Houses ASSEMBLED IN 23 MIN.

AN ALL-PRECAST, ALL-CONCRETE FOUR-ROOM DWELLING of 680 sq. ft. that can be erected in 23 min. has been developed by the Hayes Econo-Crete Corp. of America in North Hollywood, Calif., and is being submitted for the consideration of the defense housing divisions of the Army and Navy. It has been demonstrated to the Army and Navy authorities that a 1,000-sq. ft. house, if built in quantity, can be precast and erected in not more than 2 hr. (total working time).

Some of the buildings have 2-in. double walls with continuous air spaces, and the concrete mix for exterior hollow walls and partitions of these structures is, by volume, 1:3:3 of cement, sand and gravel. For buildings using solid walls and a concrete roof slab, the smooth underside of which forms the ceiling, the mix is 1:4:1 of cement, pumice and sand. The pumice not only helps in the insulation value but has the added advantage of reducing weight. With this mix the concrete shows a compression strength up to 2,600 lb. per square inch.

In a test operation, the walls, floors and roof were precast in 38 min. After curing, the slabs were delivered by truck to a location where the foundation was already in place. Here they were erected and torn down three times, the first erection being in 35 min. and the last shortened to 23 min.

The secret of such accurate and rapid erection of this precast structure is said to lie in the use of a specially designed crane which has a horizontal boom. With the load traveling along the boom, the crane is permitted to operate as close as 10 ft. to a proposed building.

(Continued on page 109)



SECTION of precast wall is lowered into place on prepared foundations at site.



ALL-PRECAST, ALL-CONCRETE HOME consists of hollow walls, interior partitions, hollow floor slab and concrete roof.

WPA BUILDS *Access Roads* AT 236 LOCATIONS



HEAVY FIELD GUNS mounted on rubber tires move more easily over camp roads at Fort Custer, Mich., after workmen finish building up trafficways to raise them above mud level.

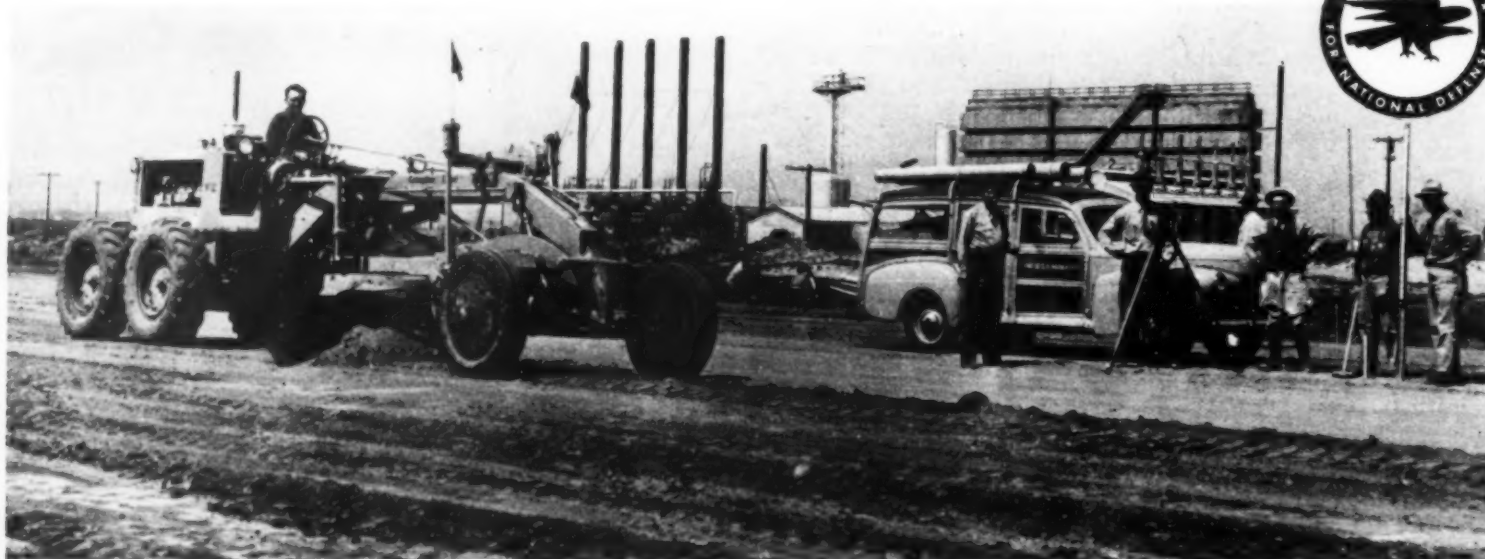


FORMS ARE STRIPPED from 2x5-ft. concrete box culvert 70 ft. long on Texas highway improvement.

AT THE REQUEST OF THE WAR DEPARTMENT the Federal Works Agency has undertaken the construction or improvement of access roads to 181 military reservations and 55 industrial plants, utilizing for these road-building operations the facilities of the Work Projects Administration, one of the constituent agencies of FWA. Already the WPA has built or reconstructed hundreds of miles of highways leading to military and naval reservations, airports and factories producing for national defense. Many of these access roads are not on federal property, and therefore Army and Navy funds could not be expended to develop them.

Typical of the projects serving defense industry plants is one near Columbus, Ohio. The new highway connects Port Columbus, the Curtiss-Wright airplane factory and the U. S.

(Continued on page 114)



ACCESS ROAD to U. S. Naval Base, Terminal Island, in Los Angeles Harbor, is widened to 96 ft. under sponsorship of Harbor Department of City of Long Beach, which supplies engineering and equipment.



SPECIAL BULLDOZER SPREADER pushes truck ahead as dump body discharges soil-cement mixture between steel wings. Spreader operator keeps as much material as possible ahead of blade while striking off heavy layer for pavement base.

Special Bulldozer

SPREADS SOIL-CEMENT MIXTURE

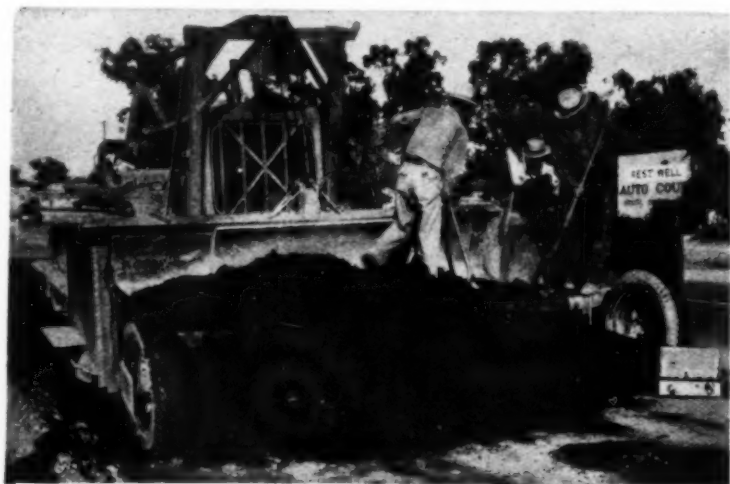
IN SPREADING A HEAVY LAYER OF PLANT-MIX SOIL-CEMENT MATERIAL for pavement base on a 6.12-mi. widening job between Beaumont and Banning, Calif., the State Division of Highways and Oswald Bros., the contractors, ran into difficulties which were obviated by devising a special bulldozer spreader equipped with side wings and adjustable bottom plates at the cutting edge of the bulldozer blade. The project added two lanes adjacent to the existing pavement and, by means of separating strips, transformed this section of U. S.

60—U. S. 99 into a four-lane divided highway. Required thicknesses of the soil-cement base ranged from 6 to 9 in., and because of the bulking characteristics of the mixture, a loose depth of about 14 in. had to be spread to obtain a compacted thickness of 9 in.

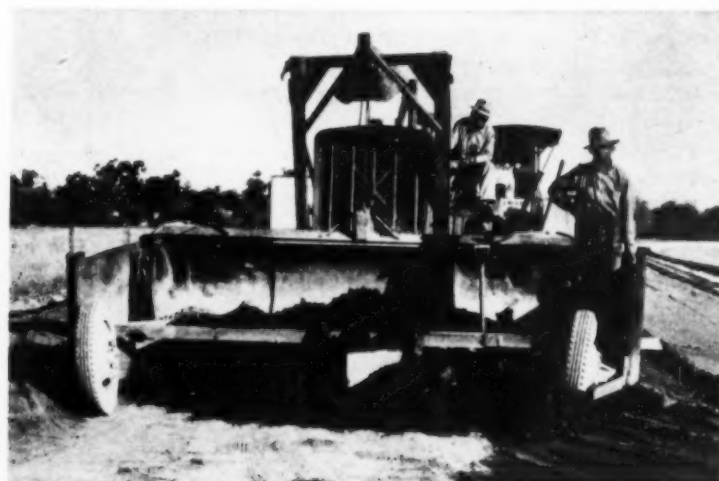
After making unsuccessful attempts to spread the mixture with standard asphalt pavement spreader boxes and with an ordinary bulldozer, the road builders developed a special bulldozer which proved satisfactory. Steel wings extending about 4 ft. forward from the bulldozer were attached to both ends of the blade. The forward ends of the wings were mounted on wheels and adjusted for elevation above grade. Thus equipped, the bulldozer worked satisfactorily except for one difficulty. The mixture when dumped from a truck was partly consolidated near the center of the mass and was less consolidated toward the ends of the blade. This unequal consolidation resulted in a crown section after rolling.

To eliminate the crown in the finished base, adjustable steel blades were placed along the bottom of the bulldozer blade and were set to strike off a section which, when compacted, would give a base of required thickness and even surface. Trucks were pushed ahead of the bulldozer while dumping, and as much mixture as possible was kept ahead of the blade at all times. Some hand shoveling was required to maintain the desired amount of material near the ends of the blade. The bulldozer spread one-half width at a time, advancing one lane 50 to 75 ft. before returning to resume spreading of the second lane.

Photos from California Highways and Public Works



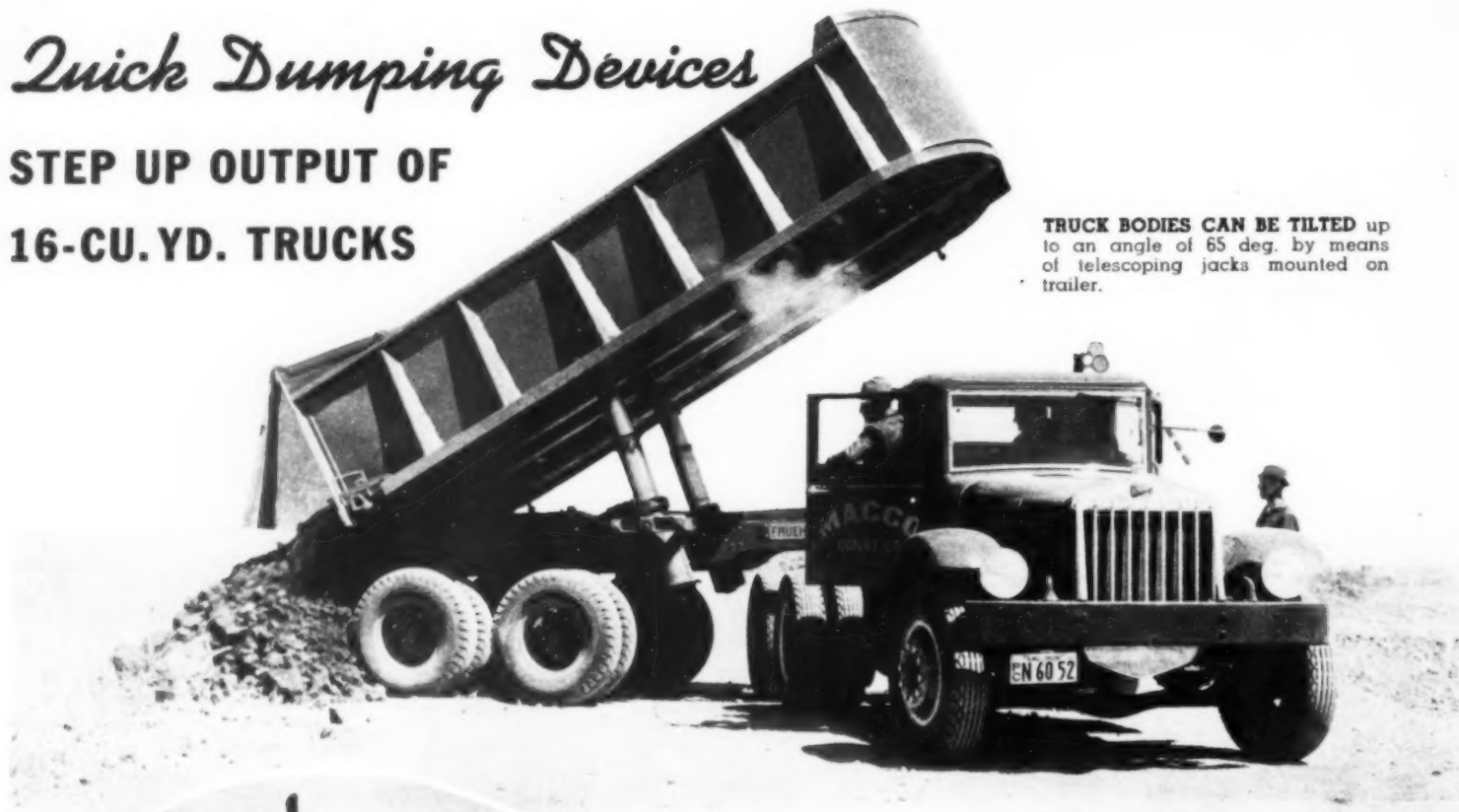
STEEL WINGS attached to both ends of bulldozer blade form hopper into which trucks dump material. Wheels traveling on subgrade support forward end of hopper.



SOIL-CEMENT MIXTURE is struck off to loose depth of about 14 in. by bulldozer spreader for compaction to 9-in. thickness.

Quick Dumping Devices

STEP UP OUTPUT OF 16-CU.YD. TRUCKS



TRUCK BODIES CAN BE TILTED up to an angle of 65 deg. by means of telescoping jacks mounted on trailer.



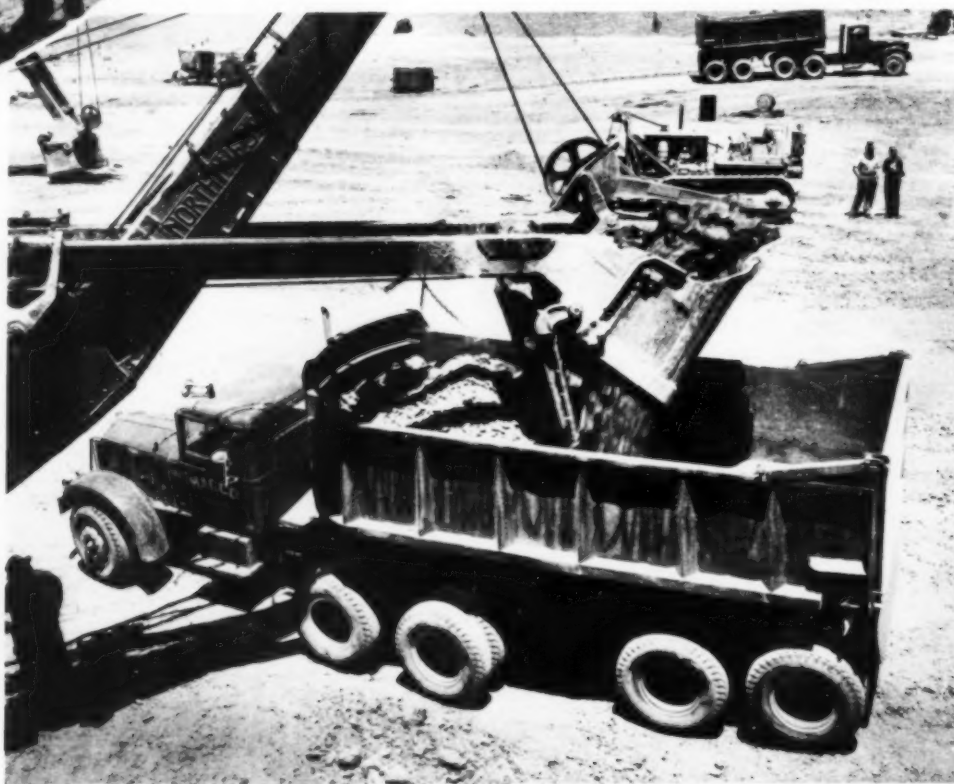
FUEL FOR DIESEL ENGINES of fleet (left) is stored in tank on hillside whence pipe line delivers by gravity to discharge point where meter measures flow into truck tanks.

giving clearance enough for large fragments to pass under it in the dumping process. Power shovels ordinarily used with this fleet are built by the Northwest Engineering Co. and preference is for the 2½-cu.yd. dippers which have been found to be the right size for maximum speed and economy with these trucks.

The three-sleeve telescoping device
(Continued on page 96)

DUMP-TRUCK BODIES with a telescoping lifting device mounted on the trailer are a familiar sight in the San Francisco Bay region, particularly where rush excavation projects have been carried out in connection with National Defense jobs. These trucks are special in that the dumping mechanism is designed for speed and stability, using only three sleeves in the telescoping cylinders that can tilt the truck beds to an angle of 65 deg. This design was developed by the Macco Construction Co. (Ben F. Wells, general superintendent) which has a fleet of 18 Sterling trucks, all 18-wheel, 16-cu.yd. (water level) dump bodies.

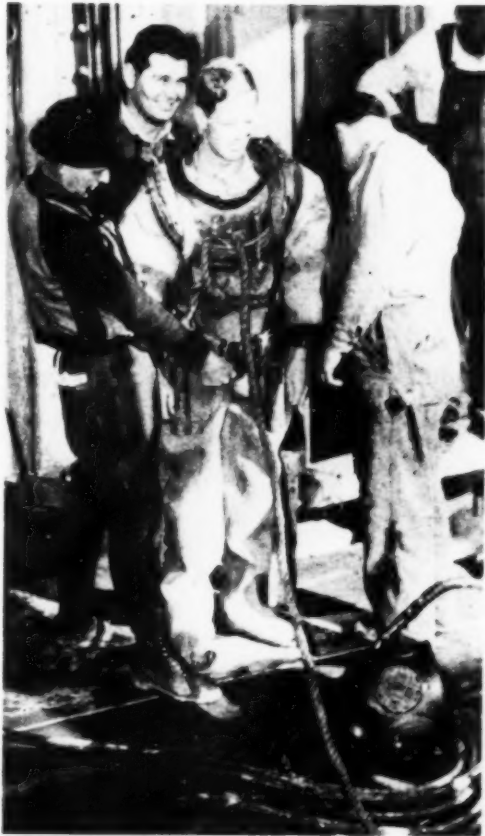
All the trucks are equipped with diesel motors and have bodies in which the forward end is higher than the sides to prevent spillage toward the cab. The tailgate hinges around a center on top of the truck sides and some 3 ft. forward of the rear end. This arrangement swings the gate up high,



2½-CU. YD. DIPPERS on power shovels are found to be best size for loading of 16-cu.yd. truck bodies. Note tail gate hinge-mounting and high forward end.

Present and Accounted For

A PAGE OF PERSONALITIES



GOING DOWN to inspect foundations under 55 ft. of water for Foster's Ferry bridge on Warrior River, REX SIKES, project engineer for Alabama Highway Department, takes over job usually performed by J. P. Trotter, chief bridge engineer, Forcum-James Co., substructure contractor, Dyersburg, Tenn., supplies diver's equipment.



COMMANDER L. N. MOELLER, U. S. Navy, is officer in charge for Bureau of Yards and Docks of constructing big naval air station at Corpus Christi, Tex. Principal contract for project with estimated value of \$23,381,000 went to Brown & Root, Inc., W. S. Bellows Construction Co., both of Houston, Tex., and Columbia Construction Co., of Oakland, Calif.



SOIL-CEMENT BUREAU created by Portland Cement Association to serve highway, airport and military engineers is headed by MILES D. CATTON, who has been in active charge of Association's soil-cement research and development for seven years.



CONSTRUCTION OPERATIONS on TVA's Watts Bar project bring together this group on suspension footbridge at dam. (left to right) FRANK BELL, TVA construction engineer on steam plant; TOM EVANS, engineer, U. S. Engineers; G. ROZENDALE, field engineer, and OREN REED, construction engineer on dam.



NEW STEAM PLANT on Los Angeles harbor at Wilmington gets under way as Commissioner E. CLARKE KEELY (left) of Los Angeles Department of Water and Power studies plan of \$8,800,000 station with McDARA KEANY and CARL STEEN, veteran Power Bureau construction foremen. First phase of work calls for excavation of 30,000 cu. yd. of earth for plant's substructure and foundations. When this work is completed, massive concrete pads to support power plant will be poured.



IN 4,349,017 MAN-HOURS of work on Santee-Cooper project during 1940, South Carolina Public Service Authority compiled good accident record under direction of T. F. JAMES, safety engineer, who this year entered Army service as lieutenant with Safety Unit, Office of Quartermaster General.



OUTLET WORKS and tunnel for Youghiogheny dam in Western Pennsylvania are constructed by Herman Holmes, Crystal Falls, Mich., under \$760,000 contract with U. S. Engineers. Project enlists collaborative efforts of: (left to right) J. P. GROWDON, chief hydraulic engineer, Aluminum Co. of America, retained as consultant by Corps of Engineers; C. M. WELLONS, principal engineer, Pittsburgh district, U. S. Engineers; S. E. BITTNER, formerly resident engineer, now with Aluminum Co. of America; (in right-hand photo) C. H. WAGNER, resident engineer; and GEORGE C. NEWTON, construction engineer for Herman Holmes.



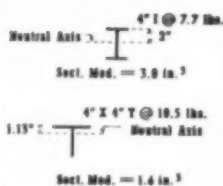
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Three types of ARMCO Liner Plates are available in a wide range of gages. There is a size to exactly fit any diameter tunnel you need. Try ARMCO Plates on your next job and judge for yourself their many time- and money-saving features. Write for prices and complete information. ARMCO DRAINAGE PRODUCTS ASSOCIATION, 5043 Curtis Street, Middletown, Ohio.



Armco

TUNNEL LINER PLATES

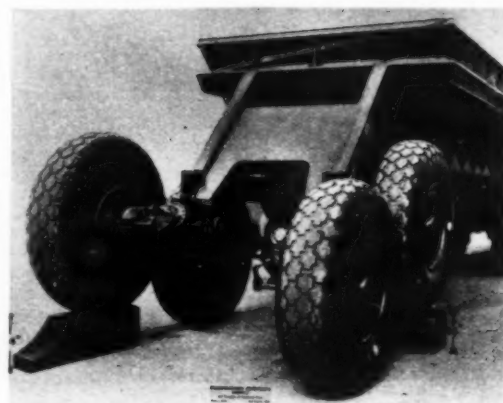
CONSTRUCTION EQUIPMENT NEWS

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Review of Construction Machinery and Materials for AUGUST, 1941

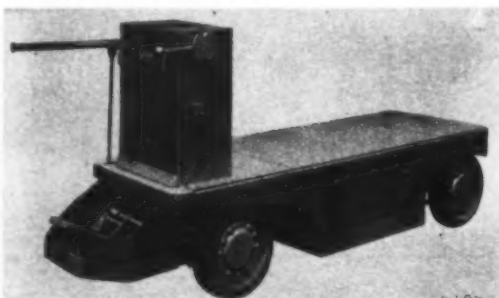


LARGE-CAPACITY SIX-WHEEL TRACTOR-TRAILER is designed for heavy-duty transport of 40-cu.yd. heaped loads by contractors. Unit consists of Tri-Pull six-wheel tractor and Maxi bottom-dump muck mover, with two doors controlled, individually or together, by two-drum winch, allowing material to be spread in windrows of varying size. Tractor may be used also to operate 23-cu.yd. carryall scraper which, when loaded, may be moved at speeds of from 15 to 22 m.p.h. Rear wheels of both tractor and trailer units have walking-beam assembly allowing 14 in. rise of wheel to reduce shock on body and to insure smooth riding over rough roadway. Speeds and drawbar pull range from 2 m.p.h. Steering is made easy in deep mud or sand by use of Garrison hydraulic steering boosters. Fluid coupling largely eliminates gear shifting and takes shock off driving mechanism. Final drive is by sprocket and heavy-duty chain to each wheel. Tractor is powered by 225-hp. motor and equipped with 18x24-in. 20-ply tires on rear and 14x24-in. tires on front. Trailer body at top measures 18 ft.x9 ft. 4 in.; height, 9 ft. 4 in.; bottom doors are 6x6 ft. 3 in.; tires 18x24-in.; 20-ply. Trailer weighs 22,500 lb. and has capacity of 80 tons. — **Six Wheels, Inc.**, 1572 East 20th St., Los Angeles, Calif.



REDUCTION OF SURFACE SCALE IN CONCRETE HIGHWAYS may be accomplished by additions of small amounts of Vinsol Resin, a resin derived from pinewood, by cement manufacturer to clinker during grinding. Improved workability is also reported by contractors who have used resin-treated cement in large-scale field tests. Since no serious strength loss is developed by addition of 0.03 to 0.05 per cent resin, point at which maximum scale resistance is produced, there is no appreciable weakening of concrete. Furthermore, improvement in workability is claimed to permit reduction in water-cement ratio,

offsetting small strength loss. Resin-treated cement is "latter" and more workable. Since Vinsol is added at cement mill, no change in equipment is required of contractor. Contractors who have used new cement report noticeable reduction in segregation of aggregate, "bleeding" and formation of pockets, reducing time between placing and finishing to such an extent that finishing crew can work immediately behind mixing and placing operations. Cost of Vinsol ingredient amounts to only fraction of cent per barrel of cement. — **Hercules Powder Co.**, Wilmington, Del.



LIGHTWEIGHT ELECTRIC INDUSTRIAL TRUCK, load-carrier type, has capacity of 3,000 lb., is designed to carry all kinds of miscellaneous items and may be loaded by hand, chain hoist, electric hoist, overhead crane or ship's tackle. Welded steel plate frame. Particularly useful when loads must be transported over gang planks, floors and in elevators of limited capacities. Four-wheel steer and small overall dimensions useful for work in narrow aisles or congested quarters. Control platform protected by streamlined bumper. Cushioned foot pedals for operator comfort. — **The Yale & Towne Mfg. Co.**, 4530 Tacony St., Philadelphia, Pa.

YOU'LL LIKE THE MONEY SAVING . . .

SPEED



and ECONOMY

OF THIS

Smooth WORKER

• These variable weight A-W Tandem Rollers roll, level and compact with speed, efficiency and economy. They change direction — forward or backward with vibrationless-smoothness.

Built in 5 to 8 ton and 8 to 10-1/2 ton sizes, this entirely new A-W Tandem embodies many operating advantages, including: Better visibility to work closer to curbs; more convenient controls, with reversing clutch lever mounted on steering column; effortless hydraulic steer; a lower center of gravity that prevents sway; less frame over-hang for rolling closer to curbs; more ground clearance under side plates to clear higher curbs.

Write for specifications and complete information . . . see for yourself why the new A-W Tandem Roller is "tops" for use on the wide variety of jobs a tandem is expected to handle . . . THE AUSTIN-WESTERN ROAD MACHINERY CO., Aurora, Ill.

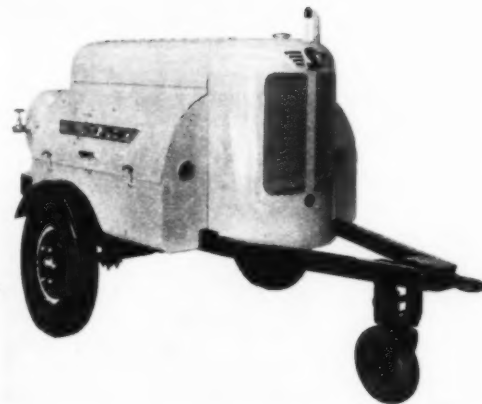
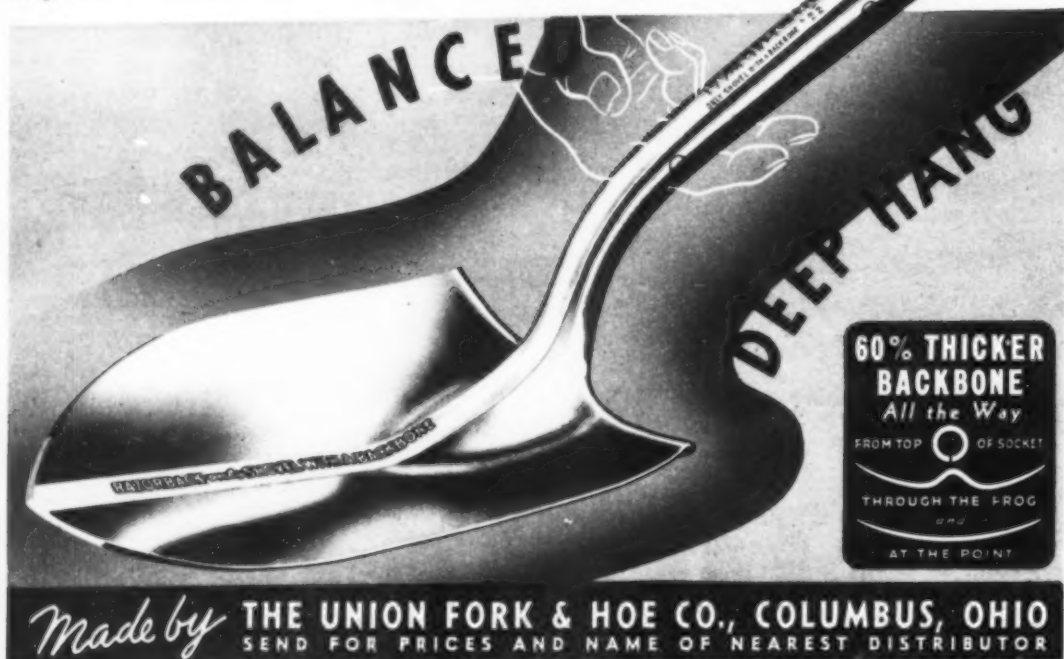
AUSTIN-WESTERN

Motor Graders
Loaders
Blade Graders
Elevating Graders
Hydraulic Scrapers
Crushing and
Screening Plants

Cable Scrapers
Rollers
Roll-A-Planes
Motor Sweepers
Bituminous Distributors
Shovels and Cranes

Its Backbone Makes RAZOR-BACK the STRONGEST LIGHT-WEIGHT SHOVEL You Can Buy . . .

Rolled with 60% more steel in the center, all the way from cutting edge, thru frog, to top of 11" socket. Tapered to the sides. Costs no more than others.



TWO-WHEEL PNEUMATIC-TIRED COMPRESSOR tows behind passenger automobile at regular traffic speeds, is built for one-man handling and may be operated by drill runner. Skid-type can be set in pick-up truck with ample room for drills and other equipment. Built in capacities 105-, 85- and 60-c.f.m. Air-cooled, single-stage with streamlined air passages, full force-feed lubrication, life time main bearings and electric starter. —Sullivan Machinery Co., Michigan City, Ind.

★ ★ ★

TOWER PAVER consists of standard 27-E or 34-E concrete paving mixer with patented trailable steel tower available in heights up to 64 ft. Boom and bucket are removed from machine and tower, designed to pivot on portable frame, is placed at dis-



charge end. Paver supplies power to raise tower from horizontal position. A-frame is mounted on top of paver with sheave and cable rigging for raising or lowering tower. Paver with tower in upright position can be moved from point to point on the job under its own power. For transporting to new site, tower is lowered and pulled away from paver for haulage as separate unit. —Foote Co., Nunda, N. Y.

★ ★ ★

EXTRA LIGHT DRILL belonging to "Multi-Vane" line is available in sizes 00 to 0. Weights range from 1½ to 27½ lb. Attachments may be procured to adapt these tools for light screw driving, nut running, close-quarter drilling, wire brushing, and sanding. Three different types of handles (straight, lever, throttle or pistol grip) are available. —Ingersoll-Rand Co., 11 Broadway, New York City.

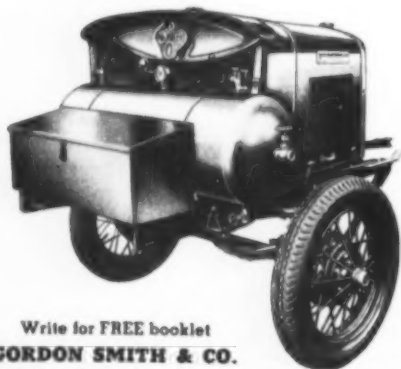


A Knockout Blow!
to large, cumbersome compressors on many of your jobs

SMITH AIR COMPRESSORS
are lightweight, sturdy and exceptionally low-priced

Consider these many advantages over heavy, expensive compressors: Move the Smith easily from one job to another. Tow it at permissible truck speeds. Made with FORD MOTORS and standard parts it is rugged, efficient. Repairs and parts available at any Ford garage. Priced far below standard compressors of equal capacity. 60 cu. ft. size uses only 1 gal. of gasoline an hour. Head equipped with high speed compressor valves: automatic unloading and idling. All the power you'll need for a majority of compressor work.

With a Ford Motor and shop facilities you can assemble your own compressor. We will furnish a Smith Compressor Head and Accessories with complete instructions for mounting.



Write for FREE booklet
GORDON SMITH & CO.
480 College St., Bowling Green, Ky.

ABCO
COVERS are
Waterproof & Mildewproof!

★ ★ ★

We manufacture a specially treated cover that is thoroughly water and mildewproof. This material is high in tensile strength and capable of withstanding severe abrasion conditions.

★ ★ ★

Write for further information
AMERICAN BRATTICE
CLOTH CORPORATION
WARSAW, INDIANA

DON'T SWEAR AT *Odd Jobs*

COUNT ON
10-B
PERFORMANCE

HANDY as a small boy's jackknife, the 10-B saves owners money on the host of unscheduled odd jobs that keep coming up around any construction project. These little jobs, usually underrated in the estimate, can steal a big slice of your profits, especially if your gang has to "bull" them through by makeshift methods.

With a 10-B available, however, there's no excuse for doing them the long hard way. Any lifting or loading job is "meat" for this speedy machine. Foundation excavating, road maintenance, wrecking service, borrow pit loading, equipment installation, steel erection, land-scaping, shop or repair yard crane service, field maintenance on heavy equipment, all are easier, quicker and less expensive the 10-B way.

There are a lot of reasons for this adaptability to deliver plus service.

First, the 10-B's convenient size and light weight: $\frac{3}{8}$ -yard dipper capacity; $9\frac{1}{2}$ tons working weight; 4 tons lifting capacity at 75% tipping load with 28-foot boom at 10-foot radius and 2000 lb. counterweight.

Second, remarkably low clearances: 5'7" rear end, 9'8 $\frac{1}{2}$ " overhead clearance, 7'8" overall width of standard (14") cats.

Third, the high speed mobility of this handy machine: $4\frac{1}{4}$ miles per hour travel speed on its own cats, four speeds forward and two reverse; makes sharp or gradual turns, maneuvering like a tractor and able to turn "on a dime."

Fourth, the high speed built into this machine combined with accurate and safe control: the 10-B easily makes 5 cycles a minute, turns out big output regularly (average output 192 10-B

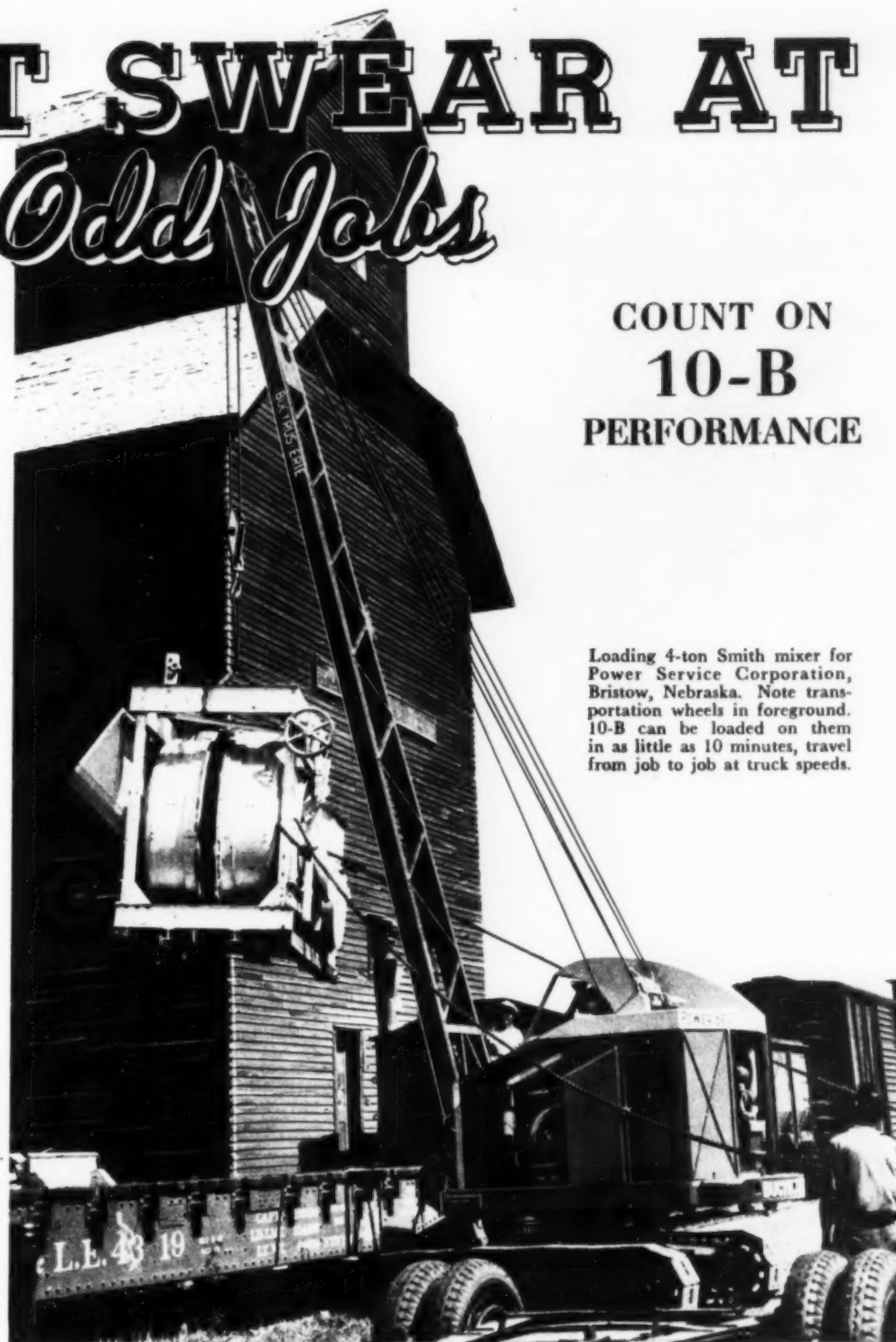
shovels, 48 yards per hour in common). The 10-B has all controls at operator's station. With single-point, self-compensating clutch and brake adjustment, gears operating in oil, anti-frictions all through (28 of them), your operator will tell you this is the easiest, fastest, and safest control available on any excavator built.

Keep costs down on your jobs by putting a "handy-man" 10-B at work. Order early because even at 24 hours a day 7 days a week our plants can't keep pace with defense requirements. Ask the Bucyrus-Erie salesman to help you plan ahead.

**BUCYRUS
ERIE**

A119

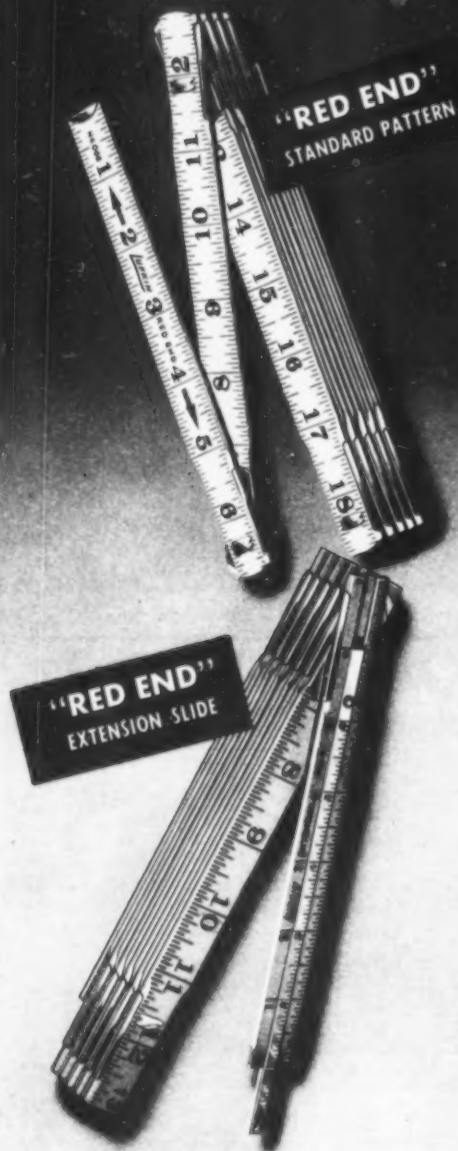
Bucyrus-Erie
S O U T H M I L W A U K E E , W I S C O N S I N



Loading 4-ton Smith mixer for Power Service Corporation, Bristow, Nebraska. Note transportation wheels in foreground. 10-B can be loaded on them in as little as 10 minutes, travel from job to job at truck speeds.

LUFKIN

WOOD RULES FOR CONTRACTORS



A few of the many reasons why "Red End" rules are so popular: They have solid brass joints and strike plates. Lock joints reduce end play. Sections are of finest straight grain hardwood. Graduations on both sides. Durable enamel finishes in snow white or cream. A wide variety of graduations.

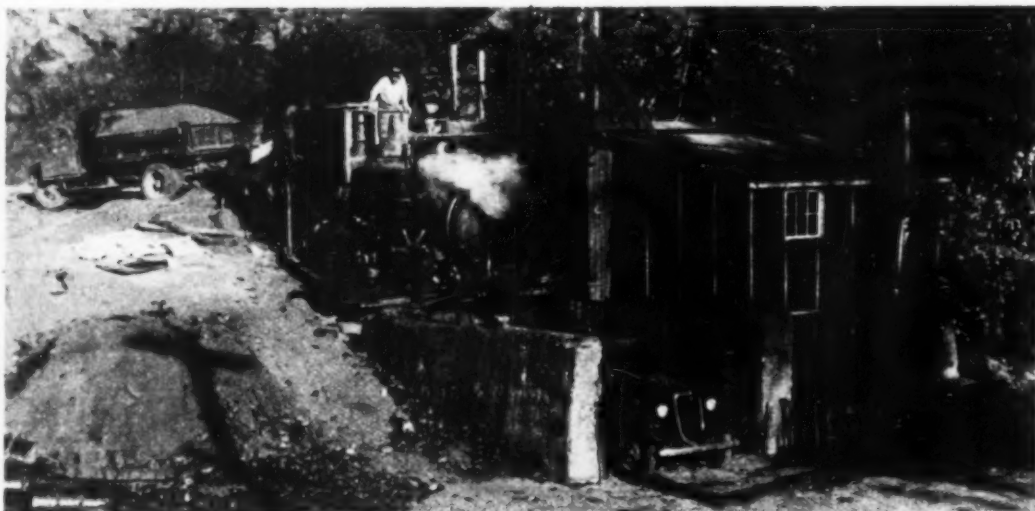
See them at your dealers and write us for free Catalog.

LUFKIN

SAGINAW, MICHIGAN • New York City
TAPES • RULES • PRECISION TOOLS

Waterproofing Agent

Improves Production and Performance of Cold Asphalt Mixes



COMPACT ASPHALT MIXING PLANT utilizes simple layout and equipment to produce cold-mix materials with assistance of waterproofing agent to assure adhesion of asphalt to unheated, undried trap rock aggregates. Boiler and asphalt tank are housed in shed at right of old concrete mixer.

THRIFTY CONVERSION to new uses of equipment already on hand and adoption of a "waterproofing agent" called Kotal to assure adhesion of asphalt to trap rock aggregate have enabled C. W. Blakeslee & Sons, Inc., New Haven, Conn., to produce at reasonable cost cold asphalt mixes having high water-resistance and long life. As reported by W. T. Gilbert, vice-president, the use of the waterproofing agent has the important advantage, from the manufacturing standpoint, that no special equipment is needed for drying, heating or mixing the materials. A steam-driven Smith 1-yd. concrete mixer turns out the asphalt mixtures; after undried aggregates have been introduced into the mixer drum, they are coated with Kotal before asphalt is applied to the batch. The mixed product is improved in a number of respects through use of the waterproofing.

Cold Mixes

In addition to the old concrete mixer, the mixing plant comprises a locomotive boiler; a 2,000-gal. asphalt tank mounted in the same inclosure above the boiler to benefit by radiated heat; a steam-driven asphalt pump, alongside the tank within the inclosure; and a belt conveyor. The plant makes three mixes, incorporating MC-2 cut-back asphalt for winter use, with 4.7 per cent bitumen by weight in all mixes. Trap rock aggregate for the three mixtures are as follows: (1) $\frac{3}{4}$ -in. crushed stone and 20 per cent screenings; (2) $\frac{1}{2}$ - and $\frac{1}{4}$ -in. crushed rock with 20 per cent screenings; and (3) $\frac{1}{4}$ -in. stone with 20 per cent screenings.

In cold weather, during the loading of the mixer with unheated, undried aggregate, a jet of steam is turned on the material. At the same time, the Kotal water-

proofing agent is introduced. The aggregate, wetting agent and lime are mixed for about 1 min., sufficient to give the aggregate its Kotal coating. Asphalt at about 200 deg. F. then is added, and the mixing is completed. Each mixing cycle produces a 3,000-lb. batch. The cost of the waterproofing is 17c. per ton of mix.

Advantages

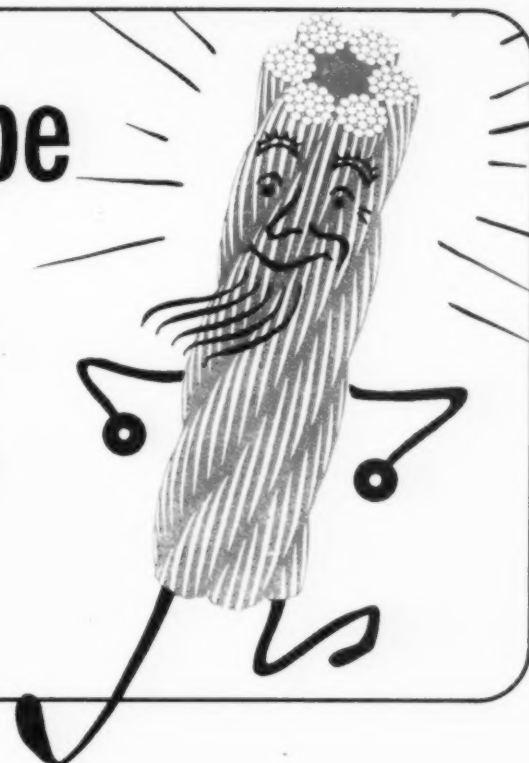
Among the advantages enumerated for the cold-mix material are the following: (1) The Kotal treatment of the aggregate is insurance against stripping; (2) the mixed material may be stockpiled through the winter with excellent results; (3) as proved by Blakeslee experience, the mix may be laid as a patch or as pavement



LIVE STOCKPILE contains 2,000 tons of mixed material stored in September and used throughout winter for patching and paving.

in cold weather, on wet surfaces, or even during a heavy rain, with excellent results; (4) when laid in a patch or in pavement, the material does not pick up under a roller or under traffic; (5) trucks, shovels and tools used in handling the material remain bright and clean, a condition which makes for ease of handling; (6) complete coating of all particles with-

Give your Wire Rope a chance to Live Long!



Check-List WHAT YOU CAN DO before you install wire rope —to help assure long rope life and safety:

1. **THE ROPE**—make sure it's the right size, construction, and quality.
2. **DRUM SURFACE**—should be in good condition.
3. **DRUM GROOVES**—should be of proper radius to accommodate the rope.
4. **"LEAD" SHEAVE**—should be properly located with respect to drum.
5. **SHEAVES**—should be of ample size and kept in good repair.
6. **SHEAVE GROOVES**—their radius should be right.
7. **SHEAVE "SHIMMY"**—look out for eccentric rotation of sheaves.
8. **GUIDE ROLLS**—if in poor condition, replace them.
9. **ATTACHMENTS**—should be of correct design and properly used.

You've often heard this: "Don't blame him—blame his environment".

That's an expression that often can be applied to wire rope, too. For when wire rope trouble is encountered, it can be traced, in a great many instances, to causes such as inadequate rope care, improper rigging, or faulty equipment.

Many wire rope troubles can be avoided—rope life lengthened—rope safety increased—by taking a few simple precautions *before* installing wire rope. For suggestions, see the Check-list to the left.

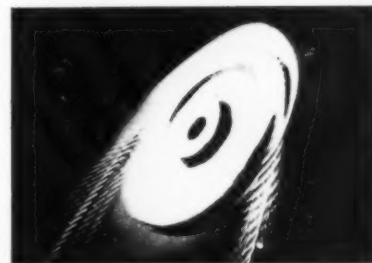
FOR COMPLETE INFORMATION regarding wire rope care —to meet your individual requirements—consult the nearest Roebling representative. He will gladly cooperate.

ROEBLING
"Blue Center"
STEEL
WIRE ROPE

FOR INSTANCE—STOP SHEAVE "SHIMMY"!

When a sheave itself is "out of round" in its circumference or has been worn eccentric, it will set up a whipping action in the rope. See right.

Watch out for this trouble. If it persists—rope life and rope safety are sure to suffer.



JOHN A. ROEBLING'S SONS COMPANY

TRENTON
NEW JERSEY

Branches in Principal Cities Export Division: 19 Rector St., New York, N.Y., U.S.A. Cable Address: "Roebling's", New York



BEND PIPE

Blackhawk "Porto-Power" Jacks are harnessed to bend pipe and rigid conduit up to 4" diameters—right on the job-site!



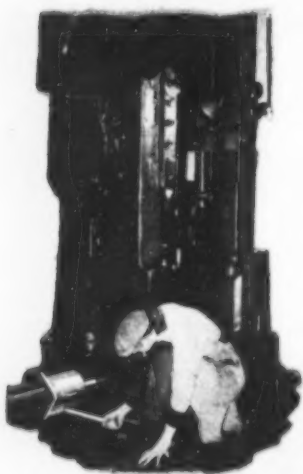
GAUGE JACKS

Blackhawk Jacks — with gauges — are the most economical, portable field testing equipment available. "Measure" up to 75 tons!



MAINTENANCE JOBS

"Porto-Power" all-directional Jacks do everything the human hand can do — but with tons of power. 1001 new uses!



EXTRA UTILITY

Blackhawk Hand Jack design permits horizontal operation at floor level.

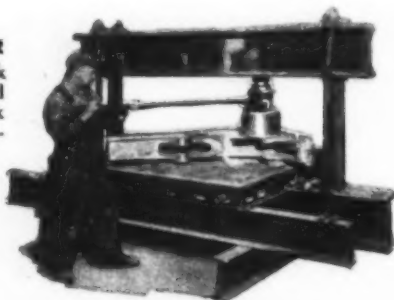
PRESS WORK

Blackhawk Hydraulic Jacks serve as power units for special presses.



SAVE MAN POWER

The 75-ton Jack shown at right, and all other Blackhawk models, are ONE-MAN operated!



HOW BLACKHAWK HYDRAULIC JACKS

Help You!

THIS "preparedness program" has been going on for 15 years — ever since Blackhawk introduced the first perfected line of Hydraulic Jacks in 1926. Constant refinements and adaptations have "prepared" the Blackhawk Jack Line for its big role of today! Efficient, dependable, portable Blackhawk Hydraulic Jacks are on deck to conserve millions of man hours in the production, construction and maintenance operations behind today's defense effort.

Blackhawk Jacks do more than lift! No doubt only a few of their uses have yet come to your attention—so be sure to see the 41H Hydraulic Equipment Guide. Ask your Industrial Supply Distributor, or write direct for it!

A Product of BLACKHAWK MFG. COMPANY
Department J2381 MILWAUKEE, WISCONSIN

out excess bitumen results in stability without bleeding.

To demonstrate the affinity of Kotal-treated aggregate for asphalt, according to Mr. Gilbert, the usual test is to submerge the aggregate in water, pour a small quantity of asphalt on top of the water, and shake the mixture in a container. The asphalt completely covers the aggregate, leaving the water clear.

Kotal-treated aggregate is also used successfully for penetration work. Advantages reported by Mr. Gilbert consist in a tighter coverage of the aggregate and the ability to do penetration work in cold, wet weather with entirely satisfactory results.

Aggregates

On the subject of anti-stripping agents, Prevost Hubbard, chemical engineer, The Asphalt Institute, in a paper entitled "Adhesion of Asphalt to Aggregates in the Presence of Water," delivered at a meeting of the Highway Research Board, Dec. 2, 1938, stated that "a given treatment which appears to be entirely satisfactory in connection with the use of one aggregate may not be equally effective with some other aggregate." The waterproofing agent used in the Blakeslee plant is highly satisfactory for treating trap rock, and according to the manufacturer, the Asphalt Treatment Corp., New York City, it has proved equally effective for treating other aggregates such as granite, quartzite, rhyolite, sand and various hydrophylic gravels. (Hydrophylic aggregates are those that have a decidedly greater affinity for water than for asphalt.)

★ ★ ★

Window Protection

DURING BLASTING

AMERICAN CONSTRUCTION ENGINEERS engaged in blasting can learn something about property protection from the experience of the British in bombed areas. Among the most important lessons learned are methods for treating glass with adhesives to prevent the glass from flying into small fragments. Although such procedures cannot be relied upon to prevent breakage entirely, certain materials, if properly applied, may help to decrease breakage.

When adhesives are used, glycerine is frequently specified. Among the materials suggested by the Ministry of Home Security, A.R.P. Department, is the use of thick, tough, or reinforced paper applied with flour paste or acacia mucilage rendered slightly tacky by the addition of 5 per cent glycerine. Transparent wrapping materials also are employed. The uncoated film may be applied to the window with a good clear gum to which 15 per cent of glycerine has been added. This adhesive is not, however, suitable for cellulose acetate film.

BLACKHAWK

WORLD'S LARGEST MANUFACTURER OF HYDRAULIC JACKS

BLACKHAWK MFG. COMPANY
Dept. J2381, Milwaukee, Wisconsin
Please send new catalog featuring Blackhawk Hydraulic Hand Jacks, Gauge-equipped Jacks, Porto-Power Remotely Controlled Jacks, Pipe Benders and Wrenches.

Name.....
Firm.....
Address.....

TOUGH HAULS ARE A CINCH *for the oil that can take it*

HEAVY-DUTY equipment keeps rolling right along when new Shell Rudis Oil does the lubricating. Here is an oil that has proved its worth . . . in the laboratory; in test engines; under the most severe field-operating conditions.

These tests, made by competent, independent engine authorities, show, beyond a shadow of a doubt, that under the most severe temperature conditions the new Shell Rudis Oil . . .

1—Has high oxidation stability.

2—Keeps rings and pistons free.

3—Is non-corrosive to bearing metals.

4—Reduces lacquer, varnish and sludge formation.

5—Cuts down engine wear.

What's more—when you use new Shell Rudis Oil you are assured the continued watchfulness of Shell men—a service which needs no prompting. Call in the Shell man today.

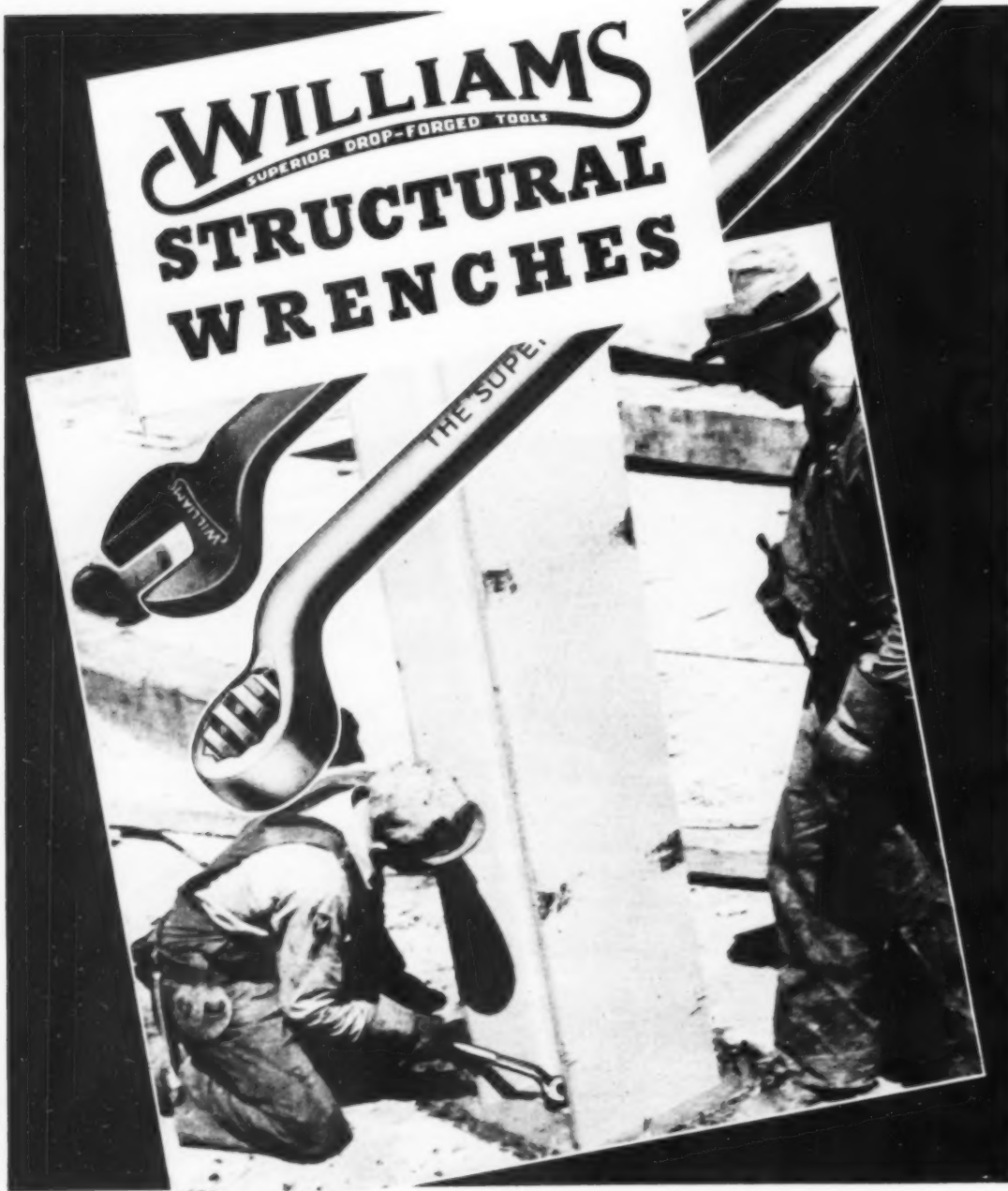


NEW SHELL RUDIS OIL
FOR HEAVY DUTY



STEEL ERECTION MOVES FASTER *with*

WILLIAMS SUPERIOR DROP-FORGED TOOLS STRUCTURAL WRENCHES



Greater speed is possible with these Williams' Open-end Wrenches — made in both Carbon and Alloy steel. Designed with long, narrow jaws for generous bearing on square nuts and proper offset of handle for fast work on rough bolts and nuts.

Williams' 12-point Box "Super-wrenches" (chrome-molybdenum)

provide positive grip and maximum safety on hex nuts. Although not as "fast" as the open-end pattern, they are excellent wrenches for use where steel work is to be permanently bolted.

Williams' Structural Wrenches are made in a full range of sizes, all fully-guaranteed. Sold by industrial distributors everywhere.



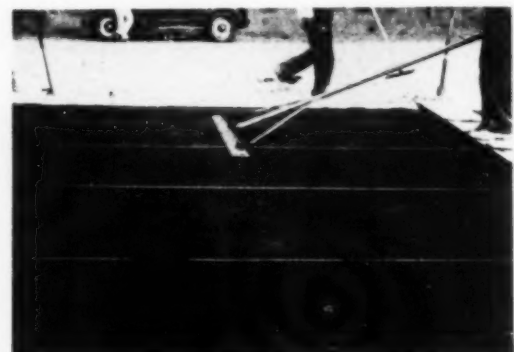
Metal Strips

Used in Guiding Asphalt Screed

STEEL STRIPS are used effectively by the Duval Engineering & Contracting Co., of Jacksonville, Fla., to guide hand screeds in distributing asphalt surfacing material on various types of roads.

The width of the 1/4-in. strips used depends on the depth of the surfacing. For example, for a 1 1/2-in. compacted top the strips are 2 1/4 in. wide.

The strips in 20-ft. lengths are set on the base just ahead of the delivery of the asphalt. The number of strips depends on the width of the paving. On an 18-ft. road one strip is set on the center line,



MAN ON BRIDGE handles hand screed riding on steel strips temporarily embedded in asphalt.

one at each quarter point and one at each edge.

To keep the strips upright a 90-deg. bend is made in one end of each of them. This provides enough support to hold them firmly in position.

Trucks dump the asphalt on a shoveling board from which it is placed between the strips by hand. The asphalt then is raked down and screeded by hand, the screed riding on the steel strips to insure accurate distribution and to reduce uneven spots to a minimum.

When the asphalt is smoothed off the length of a set of strips, the latter are moved forward to the next position. The small crevices left by the strips are filled by working a screed across the pavement. When the roller is applied, where the strips have been cannot be detected.



COLD-MIXED ASPHALT PAVING on which steel strips were used in finishing.

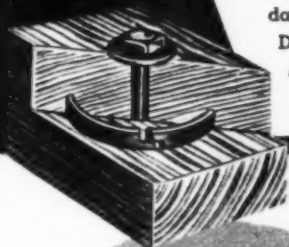


BAIRD CREEK BRIDGE PROVES *Timber* CAN MAKE IT AND TAKE IT

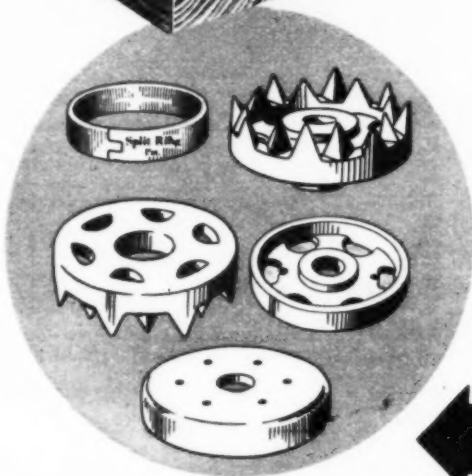
A STORY OF ENGINEERING ACHIEVEMENT

In Eastern Cowlitz County, Washington, is a modern masterpiece in timber trestle construction. The bent is 68 ft. wide at the bottom, 56 ft. wide at the top, and 3" x 10" ring connected bracing holds it together without any bolsters. Each brace has a TECO Split Ring Connector at each end connection. The bridge is 1,130 feet long and its rail height at the center point is 235 feet above the creek bed.

TECO Connectors are being used today in Roof Trusses, Overhead Cranes, Timber Bents, Trestles, Piers, Pier Foundations, Coal Pockets, Auto Loading Docks, Bridge Decks, Coaling Towers, and for many other types of construction.



TECO CONNECTORS gave the full strength of *Timber* to this TOUGH JOB



TECO Ring Connectors spread the load on a timber joint over practically the entire cross-section of the wood.

TECO Timber Connectors introduce a new technique to engineering. Because they relieve stress on timber joints by enlarging the bearing area, developing the full stamina of timber, they open many new fields to the basic economy of timber construction. Old-style plates, angles, and straps are eliminated; construction costs and maintenance expense are reduced.

TECO Timber Connectors are used today wherever enduring feats of engineering are being done. Mail the coupon now for complete technical details.

TIMBER ENGINEERING COMPANY INC.

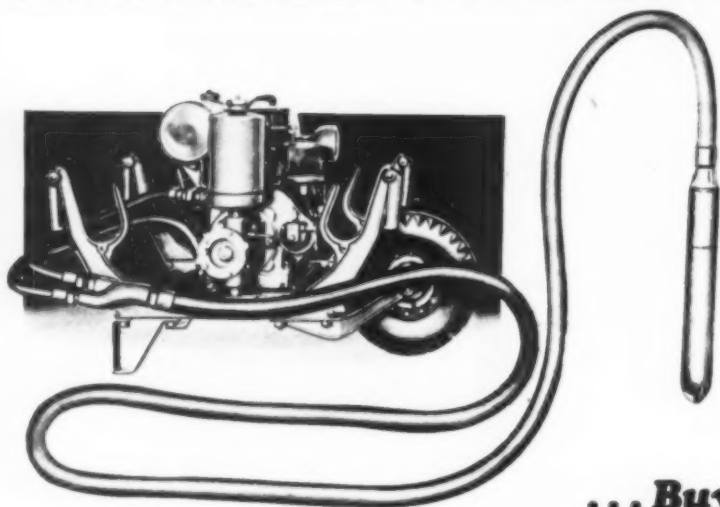
DEPT. M-8 1337 CONNECTICUT AVENUE
WASHINGTON, D. C.

Timber Engineering Co., Inc., Dept. M-8
1337 Connecticut Avenue, Washington, D. C.

Please send us full technical information on the new design opportunities in timber made possible through the development of the Teco Connector System.

Individual
Firm
Street
City State

*Why fool around with "second-best"?
If you want to make speed profitably*
GET DEPENDABLE EQUIPMENT



Automatic pressure lubrication—requires no attention.

34-ft. hose—2 3/4" vibrator head.

Adjustable frequency to 6800 R.P.M. — submerged in concrete.

Powerful gas engine—4.7 H.P.

Long-lived, ball-bearing, rotary, hydraulic pump.

... Buy the Fast

JACKSON Hydraulic Concrete Vibrator

Designed to "take it" for 3 shifts a day — every day.
Used exclusively by many large defense contractors.

ELECTRIC TAMPER & EQUIPMENT CO.

DEPARTMENT E

LUDINGTON, MICHIGAN

**IT'S
YOURS
FOR
THE
ASKING**



Let us deliver
**this
NEW CATALOG TODAY!**

Write NOW to —

ROGERS BROS. Corporation
220 ORCHARD STREET . . . ALBION, PENNA.

Planks

Form Square Edge

Joints Between

Sheet Asphalt Lanes

AS A MEANS OF IMPROVING still further the high quality of 1 1/4-in. sheet-asphalt top course laid by a Barber-Greene tamping-leveling finisher on a section of U.S.1 near South Hill, Va., the Highway Engi-



SPREADING AND FINISHING MACHINE of tamping-leveling type travels on binder course while laying sheet asphalt in 10-ft. lane. Inside edge of lane is placed against shallow planks. Trucks deliver hot mix to finisher.

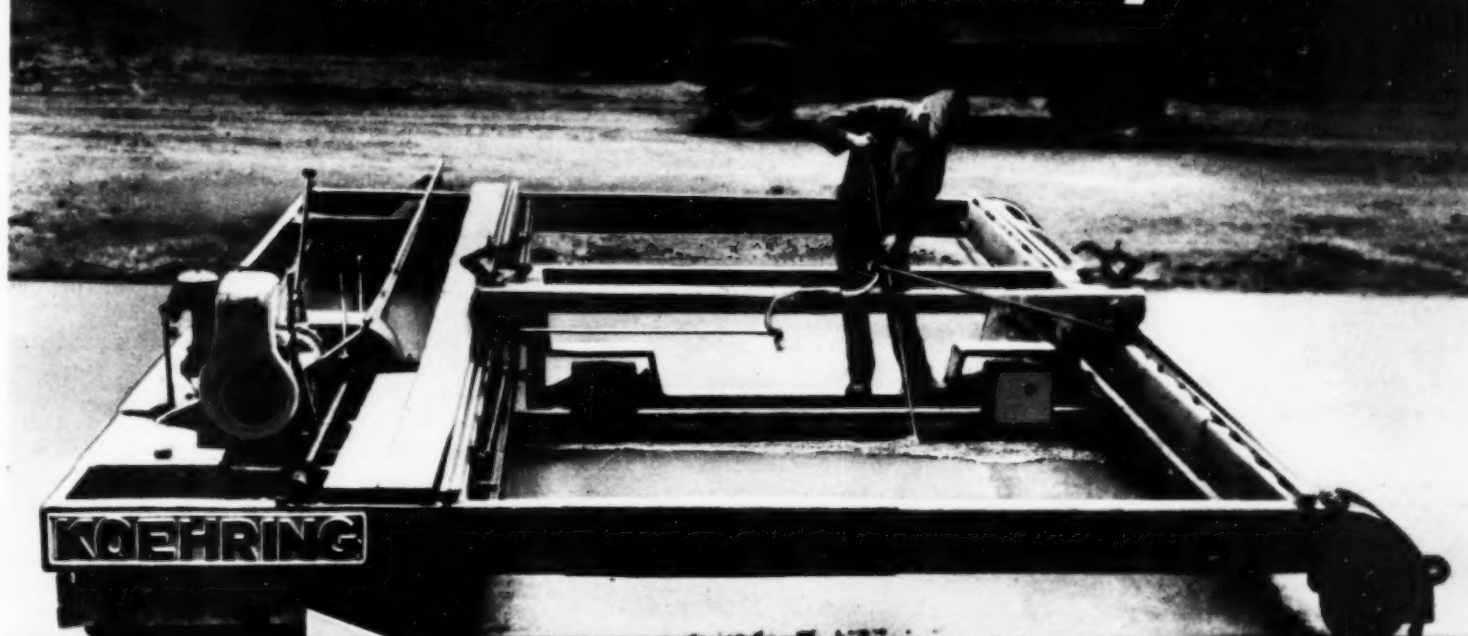
neering & Construction Co., Washington, D. C., nailed 1x4-in. planks to the binder course to form square-edge joints between adjacent 10-ft. lanes of the 30-ft. pavement. The spreading-finisher machine



WOODEN PLANKS nailed to binder course are ripped up after finishing machine has laid 10-ft. lane, leaving square-edge longitudinal joint.

traveled on the binder course, with the cutoff plate riding above the planks as it struck off the hot mix. After a lane had been laid, the planks were ripped up, leaving a square longitudinal edge, and were moved over to the outside of the next lane. Rolling completely obliterated the joint after the finisher had laid the adjacent mat.

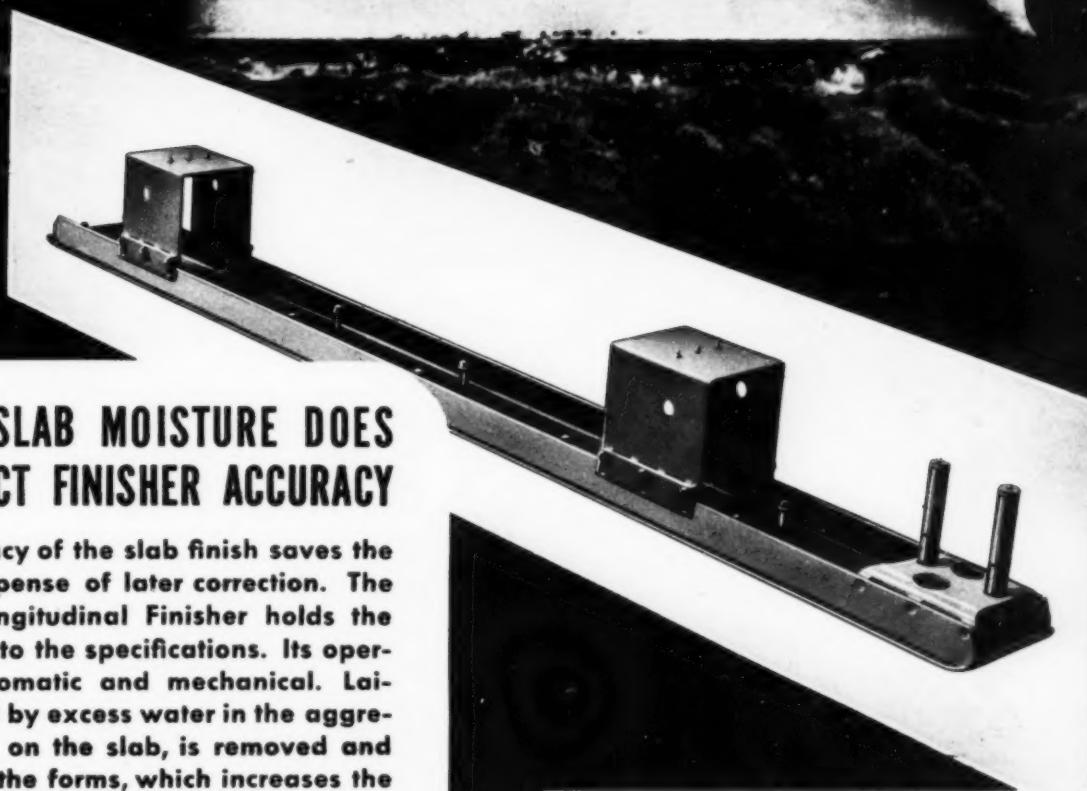
Mechanical Slab Finish Assures Accuracy



EXCESS SLAB MOISTURE DOES NOT AFFECT FINISHER ACCURACY

Initial accuracy of the slab finish saves the time and expense of later correction. The Koehring Longitudinal Finisher holds the slab surface to the specifications. Its operation is automatic and mechanical. Laitance caused by excess water in the aggregate, or rain on the slab, is removed and wasted over the forms, which increases the strength and denseness of the slab surface. Koehring finished slab surface assures contractor and engineer alike that specifications are complied with and that the surface will have a smooth-riding quality.

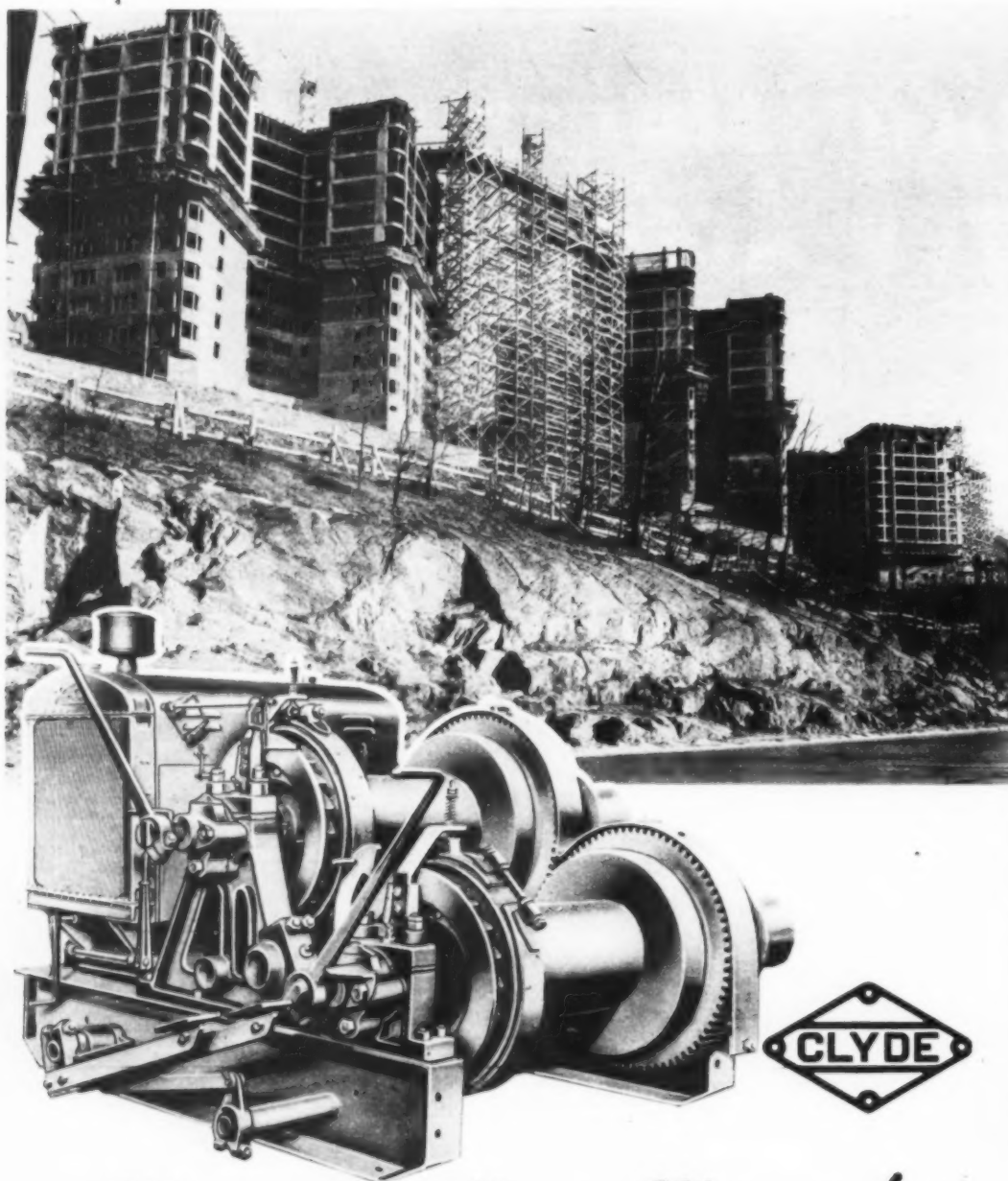
KOEHRING COMPANY
MILWAUKEE • WISCONSIN



Koehring Finisher screed has an adjustable and renewable bottom plate to maintain an accurate contact with the surface in accordance with the surface specifications.

HEAVY-DUTY CONSTRUCTION EQUIPMENT





More For Your Money!

PRACTICAL DESIGN . . .

Behind the Clyde name are many years of engineering and manufacturing experience . . . years devoted to meeting the demands of the contractor and builder. Years of constant effort to improve design, increase strength and prolong life of Clyde equipment. This experience is your assurance of getting full hoisting value when you buy a Clyde.

PROVED PERFORMANCE . . .

Thousands of Clyde machines, many of the first ones manufactured, are in use throughout the world. Their low operating and maintenance costs combined with their ability to give day-after-day trouble free performance, save time and money for their owners.

CLYDE IRON WORKS, INC.

DULUTH - MINN.

GASOLINE, ELECTRIC & STEAM HOISTS, STEEL DERRICKS, CARPULLERS, WHIRLEYS

Kneading

Forms More Resistant

Road Shoulders

COMPACTING ROAD SHOULDERS with the usual heavy roller with its unyielding wheels carried on a rigid axle sometimes fails to firm the earth uniformly, the rollers tending to bridge between high points with the depressions less thoroughly consolidated, leaving the soil in condition to promote early erosion and short life under traffic.

To compact the shoulders uniformly over the entire width of supporting roadway adjacent to the pavement, the Harrison Construction Co., of Dallas, Tex., makes use of a multi-wheeled trailer, upon which is loaded a capacity cargo of sandbags, old concrete and other heavy material. When completely loaded, the trailer carries a dead-weight lading of 17,000 lb., fairly well distributed over the nine rubber-tired wheels. Each 16x7-in. tire thus carries approximately a ton, this weight being con-



NINE-WHEELED ROLLER kneads road shoulder while compacting it, giving closely knit surface which resists erosion and withstands traffic well.

centrated on a tire-ground contact area of not more than 5 sq.in. Concentration of the load is insured by inflating the tires to 40-lb. air pressure or more, to reduce deflection at the contact area.

Such a roller, pulled across the shoulder by a 2-ton truck, first produces a ridged surface as each of the four front tires compacts a furrow, the five rear tires traveling along these ridges and forcing them to the general level. After this first pass of the roller, due to the equalizing action between wheels, low spots are readily spotted, and additional material added to bring them level with the second pass.

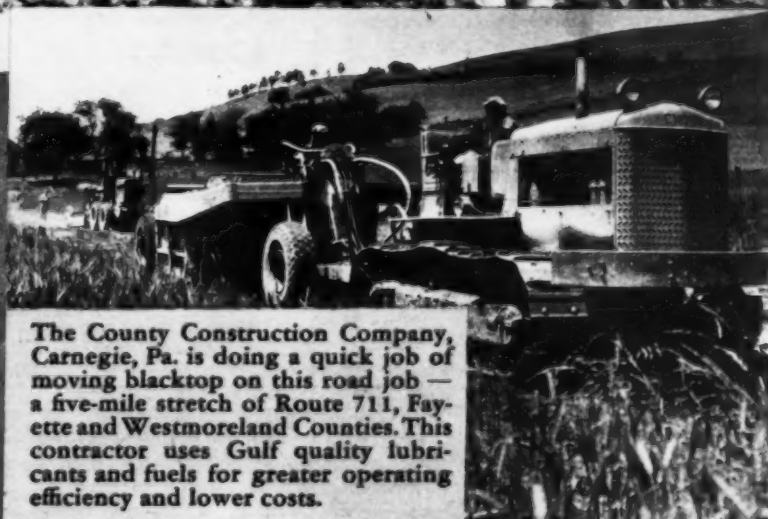
Action of the alternate tires tends to knead the loose material as it is rolled, working it slightly laterally to fill in inequalities, and helping to eliminate voids.

The use of rubber tires on this roller instead of the usual cast-iron or steel-surfaced ones also removes a common trouble encountered when rolling shoulders in wet weather. The rubber tires do not pick up material from the surface as do smooth rollers, and do not require scraping or other mechanical action to keep the surface free.

**"GULF helps us do a quicker
dirt-moving job" .. Says this Contractor**



**"With Gulf Lubricants and Fuels
we keep our equipment operat-
ing continuously and trouble-
free—which means faster com-
pletion of the contract."**



The County Construction Company, Carnegie, Pa. is doing a quick job of moving blacktop on this road job—a five-mile stretch of Route 711, Fayette and Westmoreland Counties. This contractor uses Gulf quality lubricants and fuels for greater operating efficiency and lower costs.

THE quality lubricants and fuels recommended by the Gulf engineer are playing a big part in the speedy completion of our contract," says this contractor. "With no mechanical troubles—and no unnecessary time out—day after day we move more dirt. And our costs are exceptionally low, too."

If you want the same fine operating record this contractor enjoys, here's the way to get it: Call in a Gulf engineer and ask him to recommend the proper lubricants and fuels for each piece of equipment you are using. His recommendations are based on broad experience and knowledge gained through daily contacts in

the field. And *his one aim* is to help you get maximum efficiency in the operation of your equipment.

No matter where your job is located, Gulf quality lubricants and fuels are quickly available to you through more than 1200 warehouses in 30 states from Maine to New Mexico. Write or 'phone your nearest Gulf office today.



**GULF OIL CORPORATION
GULF REFINING COMPANY**
General Offices: Pittsburgh, Pa.

UNIVERSAL Spirolocs

Pat. No. 1,925,689

FOR ALL TYPES OF CONCRETE
CONSTRUCTION

Furnished with either Handle Washers
or Nut Washers



Spirolocs showing Handle Washers, Stud Rods and a
Threaded Tie Rod

(Each Assembly consists of Two Washers and
Two Stud Rods)

The Assembly

Features:

1. Easily inserted through holes drilled in the sheathing of the wall forms.
2. Wide Range of Adjustment to accommodate any dimensions of form lumber without removing the washers.
3. Keeps the tie rods the required distance back from the wall face.
4. Permits removal of the tie rod when required.
5. Leaves a small hole to be grouted.

The Spiroloc Washer Combination

The Combination of an Assembly using one Nut Washer and one Handle Washer:

1. Allows complete installation of the assembly, except handle washer from one side of the forms.
2. Nut Washer acts as a stop to prevent the assembly from passing through the forms.
3. Handle Washer is slipped over the Stud Rod on the other side of the forms, seated against the wale and tightened with one complete turn.



Spirolocs showing Nut Washers, Stud Rods, Cone Nuts
and threaded tie rod

These assemblies may be rented with
an option to purchase

"Universal Products for
Concrete Construction"

Manufactured by

UNIVERSAL FORM CLAMP CO.

General Offices:

961-65 Montana St.

Chicago, Ill.

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Protecting Workers AFTER DEFENSE BOOM

A NATION-WIDE DISMISSAL WAGE PLAN for persons working on defense orders is now being advocated in Washington as a method of cushioning the country against the economic effect of wholesale layoffs that are expected to follow completion of the defense program.

The suggestion was first presented last month by Isador Lubin, Commissioner of Labor Statistics and administrative assistant to Associate Director General Hillman of the OPM. Testifying before the Temporary National Economic Committee, Mr. Lubin explained his dismissal wage plan as follows:

Congress should require that every defense contract provide a special defense dismissal fund for employees who have been added to the pay roll after a certain date. The fund would be made up of employees' contributions in addition to a general dismissal wage tax on payrolls. This plan should apply to subcontractors as well as the primary contractors. Funds would be paid to any worker laid off because of inability of the employer to keep him occupied through disappearance of defense orders.

★ ★ ★

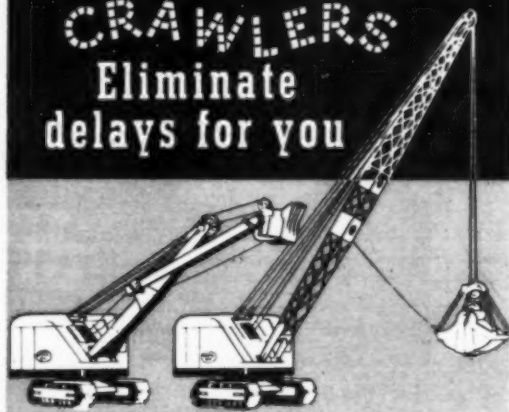
Corrosion-Resistant Paints FOR SEWAGE TREATMENT PLANTS

NEW PAINTS which will resist the corrosive atmosphere of sewage treatment plants have been developed from a chlorinated rubber paint base, according to an announcement by Hercules Powder Company. Parlon, the new base, is available to all paint manufacturers for their own formulations.

Gases generated by septic sewage have made it impossible to keep surfaces painted in these plants, resulting in an unsightly appearance and severe corrosion of metal and concrete surfaces.

Corrosion in sewage treatment plants, engineers have determined, is caused by the action of hydrogen sulfide generated in the sewage by bacterial action. This gas, combining with the oxygen of the air and the moisture always present in these

Byers SELF-CLEANING CRAWLERS Eliminate delays for you



● Byers crawler pads don't bind, buckle or bog down because they are *really* self-cleaning. Wherever you see crawler treads with only one big center lug on each tread . . . and that lug tapered in all directions to fit an equally open simple end-sprocket . . . then you can be sure the treads are really self-cleaning. And 9 times out of 10 they will be Byers treads.

This is another reason why you should investigate Byers.

**11 FULLY CONVERTIBLE MODELS
IN 3/8-1/2-5/8-3/4 YD. SIZES**

Modern CRANES and SHOVELS

BYERS
RAVENNA, OHIO

COFFING Safety Pull HOISTS



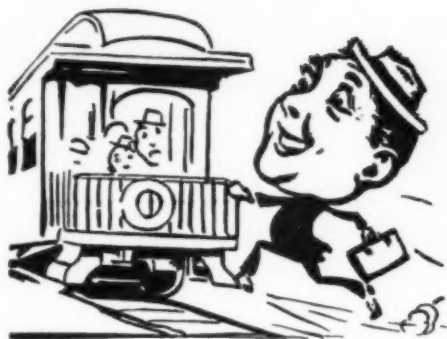
**MORE PROFIT
LESS MAINTENANCE...
when they're on the job . . .**

Here's a one-man tool that can do a hundred and one jobs on any construction project. One man and a Coffing Safety-Pull can lift, pull, move, and do many emergency and repair jobs. When used in batteries they exert powerful uniform action that makes them invaluable for certain kinds of construction work. Let us send you circulars telling all about Coffing Safety-Pull Hoists — their safety features — their efficiency — their easy portability — their low first cost.

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**CONSTRUCTION METHODS
330 W. 42nd St. New York City**

plants, produces dilute sulfuric acid which quickly attacks first the paint and then the metal or concrete beneath.

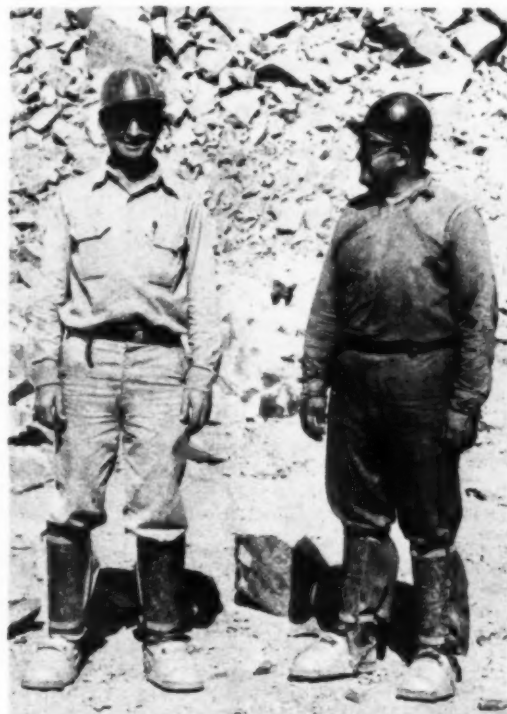
These new paints are suitable for treatment plants because of their resistance to weak or strong acids and alkalies, alcohol, gasoline, naphtha, and mineral oils and greases. While the paints are soluble in animal and vegetable oils and greases, these oils do not reach walls, floors, ceilings and machinery for which the paints are recommended.

Method of Application

The finishes may be applied by spraying or brushing after the surface has been properly prepared by cleaning, derusting, removal of grease and drying. Smooth concrete must be etched with 10 per cent hydrochloric acid to provide a bond for the paint. When applying by brush the painter should flow the finish on from a full brush and avoid going over the painted area any more than necessary. Only 2 to 4 hours drying time at room temperatures is needed with spray finishes, while 6 to 8 hours are needed between brush coats.

★ ★ ★

Safety Measures AT PRADO DAM



PROTECTION OF FEET, EYES AND HEADS of workers in quarry at Prado dam, U. S. Engineer Department earth fill project being built in California by Prado Constructors Inc., is assured by wearing of safety shoes, goggles and hard hats. Metal coverings over toes of shoes worn by Jimmy Stypes (left) quarry foreman and Wickey Flickinger prevent foot injuries caused by falling rock.

There's a HAISS BUCKET for Every Kind of Job



All sizes available. Wire or write for prices. Descriptive Bulletins on request . . . Buckets in stock at New York, Hartford, Philadelphia, Harrisburg, Baltimore, Atlanta, Birmingham and Los Angeles.

GEORGE HAISS MFG. CO., INC.
139th St. and Canal Place, New York, N.Y.



Left: Whiteman Finishers were used on all cement floors of the new Douglas Aircraft Plant, Long Beach, Calif. Illustration is artist's conception of completed plant. Below: Gasoline model Whiteman Finisher—also available with electric drive.



FINISHING COSTS Slashed on 1,500,000 sq. ft. of cement floor

After finishing 1,500,000 sq. ft. of cement floor with Whiteman machines, Frank W. Starr, General Superintendent, Walker Construction Co., has this to say:

"You can put me down in your little black book as one of your boosters, because, after using your machines (Whiteman Cement Floor Finishers) for the past 4 months and finishing something over 1,500,000 sq. ft. of floor finish, I am convinced that the Whiteman Finisher not only is a labor saver, but a money saver."

WHITEMAN

MANUFACTURING COMPANY

3249 Casitas Avenue

Los Angeles, California

You finish floors at substantially reduced cost with the Whiteman Precision Cement Floor Finisher, which eliminates unnecessary costly over-time—prevents floors from "getting away from you" when extra finishers are not available. This machine finisher has saved floors under severe weather conditions, bringing the finish up and obtaining an excellent hard surface.

You can cover 1,000 sq. ft. of floor in as little as 15 minutes with the Whiteman Finisher. Its rotating, adjustable pitch trowels produce flatter, smoother floors in half the time—at lower cost. This PROVED Finisher gives you denser, more wear-resistant, level floors.

Now being used on construction projects all over the country. See it in action! Write today for the name of your nearest dealer.

NEWS FROM MANUFACTURERS *About Their Products*

The publications reviewed below, will keep you posted on latest developments in construction equipment and materials available for your use.

VIBRATED CONCRETE PAVEMENT — **Blaw-Knox Division, Blaw-Knox Co.**, Pittsburgh, Pa. (8 pp., illustrated.) Bulletin No. 1825 gives test results of vibrated and non-vibrated concrete pavement on Indiana State Highway Department project where effect of spreader-vibrator was studied. Illustrations include photographs of cores and cut-out pavement sections.

★ ★ ★

TRANSMISSION BELTING — **B. F. Goodrich Co.**, Akron, Ohio (4 pp., illustrated). Pamphlet describes processes of manufacture and testing of materials and fabrication as belt is made. Subjects are discussed under headings of stronger and more uniform fabric, all fabric buried, moisture control, batch testings, oil resistance, uniform cure of press laps, aging qualities, flexing, uniform stretch during manufacture, uniform pressure during cure, recovery, belt finish, revulcanization and plylock splice. Description of other belts in Goodrich line is included, as well as Goodrich belt dressing and Plastikon stick dressing. Net weights of each belt per inch of width per 100 ft. also are given and table on shock sizes of transmission belting including belt widths and number of plies.

★ ★ ★



AIRFLEX COUPLINGS — **The Falk Corp.**, 3001 West Canal St., Milwaukee, Wis. (19 pp., illustrated.) Data on five types of Airflex couplings developed to protect machinery from impacts resulting from irregular torque of prime mover or driven machine. Design features use of resilient rubber gland and outer section of durable fabric and live rubber. Suitable for connecting diesel, oil or gasoline engines to any type of driven equipment for smooth power delivery. Dimension drawings and tables. Suggestions on how to select these types of couplings.

connecting diesel, oil or gasoline engines to any type of driven equipment for smooth power delivery. Dimension drawings and tables. Suggestions on how to select these types of couplings.

★ ★ ★

MINING AND CONTRACTORS' AIR-POWERED TOOLS—**Independent Pneumatic Tool Co.**, 600 W. Jackson Blvd., Chicago, Ill. (64 pp., two color, illustrated.) Contains descriptions and specifications of all Thor rock drills, paving breakers, clay and trench diggers, sump pumps, saws and associated air tools. In addition, it depicts specific applications and uses for various tools, gives detailed information on accessories and equipment for use with tools, and points out important construction features.

★ ★ ★

EXPANSION ANCHORS—**The Rawlplug Co., Inc.**, 98 Lafayette St., New York City. (40 pp. pocket size, illustrated.) Covers extensive data, charts and tables on expansion anchors. Also complete data on all types of anchors, together with list of uses and other engineering data.

★ ★ ★

TIMBER FOR HANGARS—**West Coast Lumbermen's Association**, Seattle, Wash. (8 pp., illustrated.) Timber can be used to meet, promptly and effectively, the need for hangars on the 3,500 civilian airports this country must immediately construct. This pamphlet on "Wood Hangars of Douglas Fir" illustrates the use of timber in hangar construction and describes the results of fire tests on timber hangars. Timber truss designs are shown and data are given about Civil Aeronautics Authority plans for hangars.

SCHRAMM AIR COMPRESSORS

**QUICK
STARTING**

**EASY
HANDLING**



SCHRAMM Model 105 Compressor on Pneumatic Tires

TWO FEATURES that save time and money—combined in SCHRAMM Portable Air Compressors.

ELECTRIC SELF-STARTING . . . push the button, just like your automobile. Instant Air. No dangerous cranking, no stalling. Fast, safe starting with SCHRAMM.

LIGHTWEIGHT . . . less weight to move. Saves trucking expense. Reduces time in moving on the job. The greatest time and money saving features ever introduced in "Portable" Compressors.

Write for illustrated Catalog No. 42-P

SCHRAMM, INC.

WEST CHESTER, PA.

DEALERS IN PRINCIPAL CITIES



**THE ADAMS LINE
ALSO INCLUDES:**

LEANING WHEEL GRADERS
6½ to 12 ft. blade sizes.
Hand and power operated.

ELEVATING GRADERS
With 42 or 48 in. carriers.
Fully power operated.

HAULING SCRAPERS
Cable-controlled.
Available in several sizes.

TAMPING ROLLERS
With exclusive removable
foot feature.

ROAD MAINTAINERS
Multiple-blade type with auto-
matic blade control feature. For
high-speed operation (up to 15
m.p.h.) behind trucks or tractors.

**ROTARY SCRAPERS,
FLOWS, ETC.**

Blades for All Types and Makes
of Road Machines.

● **WHEN YOU** determine to buy a motor grader don't make the mistake of concluding that all makes are about alike. There are certain mechanical and operating features which you should demand. You get all of them in Adams Motor Graders as listed below:

BALANCED WEIGHT DISTRIBUTION

Proper weight on rear wheels for traction; on front end to prevent skidding away from heavy side loads; and on scarifier and blade to cut through hard material.

RIGID BLADE SUPPORT FOR SMOOTH CUTTING

Strong, rigid frame—rigidity and absence of lost motion in blade control. Important on maintenance and fine grading.

WIDE RANGE OF TRAVEL SPEEDS

Provides proper speed for doing every job in least time and at lowest cost. High top speeds for transporting.

POSITIVE MECHANICAL CONTROLS

Faster and more accurate blade adjustments than with hydraulic controls. Cause less trouble—easier to service.

HIGH BLADE LIFT FOR BANK WORK

Adams Motor Graders are adjustable to handle all types of surface, ditch and bank work.

EASY STARTING ENGINES

Diesel engines that start instantly on gasoline and switch to full Diesel operation without the use of auxiliary engines, extra batteries, etc.

CONVENIENT OPERATION

Conveniently located controls. Operator's seat adjustable horizontally and vertically. Operator always has good vision of work whether seated or standing.

CHOICE OF SIX MODELS

Three models with gasoline engines and three models with Diesel engines permit selecting machine to best suit your purse and purpose.

See your local Adams representative today for further particulars, or write for descriptive catalogs.

J. D. ADAMS COMPANY • INDIANAPOLIS, INDIANA

ADAMS *Motor Graders*

**HERE'S A CLIP
THAT DOESN'T
CRIMP**



**IT GRIPS
LIKE A FIST!**

Laughlin drop forged Safety Clips treat wire rope right. No bending — crimping — or fraying the strands. After removing Laughlin Safety Clips, the rope is straight, unbowed, ready for use again — saving wire rope.

Use Laughlin Safety Clips and avoid rope-crimping with U-Bolt Clips.



FEWER CLIPS NEEDED. Laughlin Safety Clips are so efficient that three of them give you the same strength as four ordinary U-Bolt Clips.

Use Laughlin Safety Clips and save money.

THIS TEST DESCRIBED IN NEW BOOKLET. Tests made by a famous engineering school prove conclusively that Laughlin Safety Clips delivered better than 95% of rope efficiency.

Write for the free booklet that describes these tests — and also the other money and time-saving advantages you get with the modern "fist-grip" clip. Use the coupon below

THE THOMAS LAUGHLIN CO.
Portland, Maine

Please send me free Safety Clip booklet G-8
Name.....
Company.....
Address.....

Check here for catalog on items below ☐
Look for Laughlin products in Thomas' Register
and buy through your distributor.



Winter Construction SETS FAST PACE ON 10-ACRE AIRCRAFT BUILDING

(Continued from page 59)

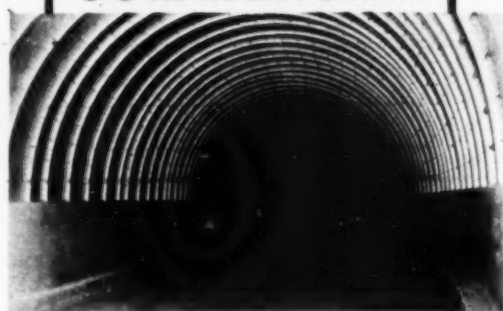
steel frame and roof deck, cleared the way for the remaining operations on the building.

Features of Building—Included in the 900-ft. length of the building are a high section 750 ft. long, with 35-ft. clearance under the lower chords of the trusses, and a low section 150 ft. long with 20-ft. clearance under the trusses. The low section covers the 100x500-ft. basement area at the west end of the building and extends 50 ft. beyond it. In the main section, 750 ft. long, the building is divided laterally in three bays, a 200-ft. bay in the center and a 150-ft. bay on each side. The low section is made up of five 100-ft. bays. Throughout the length of the building columns are spaced 50 ft. c. to c.

Trusses in the high section of the building are 12 ft. deep, and roof monitors, with sash facing north and south, rise to a maximum height slightly exceeding 60 ft. above the floor. Bonded 20-year built-up roofing covers the wood roof deck. The building structure is separated into independent units by two transverse expansion joints, one at the junction of the low and high sections and the other about midway of the high section. Expansion joints are closed by flexible bronze caps and diaphragms of novel design.

Exterior walls, from the grade beams to the roof, comprise: (1) A horizontal band of 8-in. buff-colored smooth-faced tile to a height of 7 ft.; (2) steel sash, supported by girts connected to the building columns, extending from tile wall up to the level of the lower chord of the trusses and (3) a 2-in. Gunit curtain covering the space from the top of the sash to the roof cornice. At the west end of the building is a loading platform parallel with the railroad spur. This end of the building (the low section) will contain the machinery section and stock-rooms. In the east wall at the opposite end of the building are two large Truscon doors of the canopy type providing horizontal clearance of 48 and 192 ft., respectively. The larger door is made up of four independently operated units each 48 ft. wide, raised and lowered by electric-motor-driven hoists, with auxiliary hand winch control for use when electric power is not available. These doors open in two movements, the lower half first being raised vertically until it is level with the upper half and the two sections then swinging about a horizontal axis until they form a canopy extending about 17 ft. beyond the building wall. Vertical

COMMERCIAL



**... MEETS EVERY
TUNNELING NEED ...**

... HERE, A HIGHWAY UNDERPASS!

The many uses to which you can put **COMMERCIAL LINER PLATES** are only surpassed in value by their installation features of safety, economy and easy use. Here, you see **COMMERCIAL** Plates utilized in underpass construction on the Maricopa-Ventura highway in California. Note the neat appearance . . . the perfect safety the **COMMERCIAL** Plates provide. Commercial plays an important part in low cost highway construction that requires underpasses. Consult with one of our representatives. He'll show you a plate for your next job, regardless of tunnel size or ground conditions. In the meantime, write for our latest catalogs and familiarize yourself with the complete **COMMERCIAL** selection of Liner Plates.

The **COMMERCIAL SHEARING &
STAMPING CO.**
YOUNGSTOWN, OHIO

FOR YOUR

Calcium Chloride

NEEDS

WRITE or WIRE:

**MICHIGAN ALKALI
COMPANY**

General Sales Office: 60 E. 42nd St., N.Y.C. Plants: Wyandotte, Mich.



Placing Concrete Along Edges of Forms on Pavement Work.

You can save hundreds of dollars ordinarily spent for single-purpose power tools, reduce idle tool-hour losses, cut maintenance costs and make more money with this Mall Portable Power Unit. It operates all day on 1½ to 2 gallons of gasoline and supplies low-cost driving power for 9 important interchangeable tools. It is easily wheeled right up to the job — is easy to start and runs by itself. Interchangeable attachments can be furnished for Concrete Vibrating, Concrete Surfacing, Form Sanding, Sawing, Sharpening Tools, Drilling, Grinding, Wire Brushing and Pumping.

Get the facts on this money-making unit TODAY — Write for a Free Demonstration and 1941 Catalog. A national network of MALL distributors, agents and district offices in all principal cities assures you of prompt service regardless of where YOUR job is located.



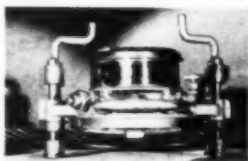
★★ We make over 200 gasoline engine, air and electrically operated tools and attachments.

MALL TOOL COMPANY
1757 SOUTH CHICAGO AVENUE CHICAGO, ILL.



... on wire lines and cables in the field are a cinch for the Martin-Decker Tension Indicator—it catches 'em all! Without paper calculations and without deadending, it indicates the exact load in pounds as it falls on the line. Damaging impacts as well as strong, steady pulls are easily read by simply clamping the Indicator to the line and reading the dial. No wrenches needed — you can make quick, frequent checks to be sure you're safe!

Three Models — Miniature, Standard, Heavy Duty — cover line sizes up to 1¼" diameter with corresponding capacities. All models adjustable for temperature. Write — asking also about the Martin-Decker Measuring Line Weight Indicator!

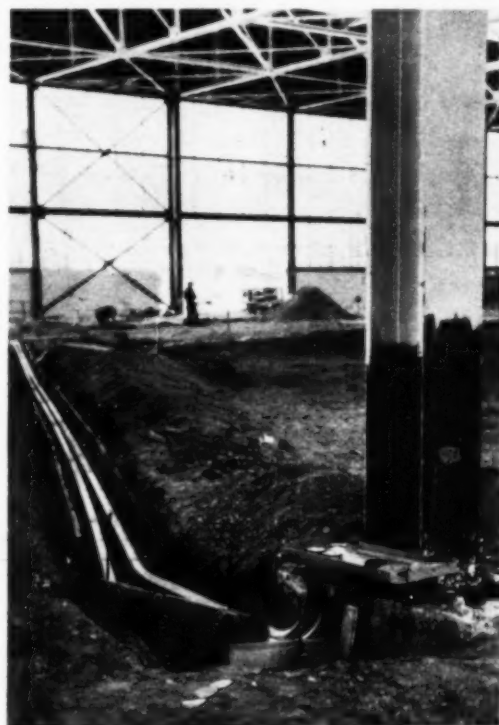


MARTIN-DECKER CORP.
LONG BEACH, CALIFORNIA
1000 LONG BEACH AVENUE, LONG BEACH, CALIFORNIA
CHICAGO, ILL. 1000 CHICAGO AVENUE, CHICAGO, ILL.

clearance under the open doors is about 34 ft.

Six locker rooms and two toilet rooms are installed in the basement section of the building. Employee access to the building is provided by two outside covered stairways leading down to the basement section. Inside the main section of the building, additional toilet facilities are provided by four combination toilet and transformer rooms constructed below floor level.

Roof drainage is carried down pipe leaders alongside building columns into drain tile under the floor. Conduits for electric power, telephone and compressed



ELECTRIC POWER CONDUITS connect into panel boxes at building columns.

air lines also are placed under the floor and are incased in a minimum of 3 in. of concrete. Insulated water lines and steam lines for unit heaters are supported in the roof trusses.

Excavation

Groundwater table is about 29 ft. below grade at the site of the Republic Aviation Corp. plant, permitting dry excavation for foundations and auxiliary facilities of the new assembly building. Aided by floodlights at night, the power shovel, three clamshell cranes and three Le Tourneau 12-yd. scrapers hooked to Caterpillar tractors worked on a three-shift basis to remove 40,000 cu.yd. of the sand-gravel soil in the first 7 days on the job.

Concrete

Total concrete requirements of about 14,800 cu.yd. for the new building are supplied by the Colonial Sand & Stone Co. in 5- and 5½-yd. truck mixers from a nearby commercial batching plant; the average one-way haul is about ¾ mi. On several days the contractor placed as much

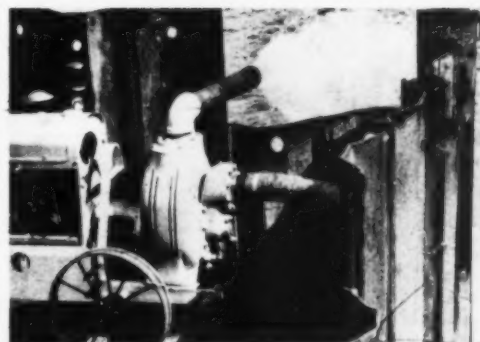
(Continued on page 90)



DUAL
PRIME
CENTRIFUGAL

PUMPS

**NEW — NON-CLOGGING
DESIGN — UNMATCHED
IN PUMP EFFICIENCY**



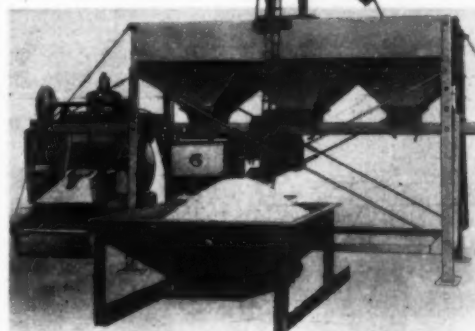
Big 40-M CMC pumping 40,000 G.P.H. on bridge job. A standout pump for all around service.

Doubly fast — doubly sure. Only CMC has dual prime. Sizes up to 10" — unbeatable in performance, stamina, dependability.

COMPLETE BIN BATCHER

Loads, weighs, charges Mixer. An unbeatable concrete producing set-up. Saves men ... speeds up work. Now available with bucket elevator and receiving hopper as illustrated.

Get the facts on this "top" money-making unit. Furnished with or without elevator — or trolley, scale and weight hopper offered as unit to those who desire to build own bins.



For the most efficient production combination, the CMC Bin Batcher with a modern CMC 105 or 145 Mixer.

**GET THE LATEST
CMC CATALOG!**

See what's new and better in Concrete Mixers, Hoe-Type Mixers, Batching Equipment, Pumps, Hoists, Power Saws, Carts, Barrows!

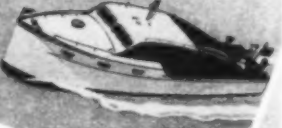
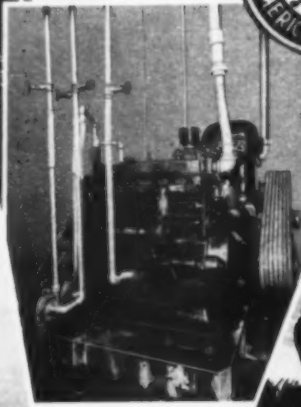
**CONSTRUCTION
MACHINERY CO.**

Waterloo, Iowa

ON THE JOBS America Has To Do

*today
and tomorrow*

TO CONTINENTAL Motors Corporation, the term "national defense" embraces all the power jobs America has before it. None is more important than building Red Seal Engines for leading manufacturers of farm tractors, combines and machinery. Other equally important jobs are adapting Red Seal Power for the highways to be laid, buildings, bridges and dams to be erected, oil to be pumped, the speeding of transportation — land, sea and air. In addition to these and many other worthwhile jobs Continental is doing more than its part by producing on schedule engines for Army and Navy trainer planes, Army tanks, scout cars and many other applications to help keep America strong.



Continental Motors Corporation

MUSKEGON, MICHIGAN

CONTRACTORS AND SUBCONTRACTORS

MANUFACTURING AND ASSEMBLY BUILDING

Republic Aviation Corp.
Farmingdale, L. I., N. Y.

General contractor—Turner Construction Co.
Structural steel contractor—Bethlehem Steel Co.
Subcontractors (Turner Const. Co.)

Ready-mixed concrete—Colonial Sand & Stone Co., New York

Reinforcing steel—Bethlehem Steel Co., New York
Gunite—Cement Gun Co., Allentown, Pa.

Steel mesh—Fireproof Products Co., Long Island City, N. Y.

Cement finished floors—Brennan & Sloan, New York
Tarvia pavement—Gifford Const. Co., Great Neck, L. I.
Dampproofing and calking—Brisk Waterproofing Co., New York

Steel sash and doors—Truscon Steel Co., New York, N. Y.

Metal toilet partitions—Fireproof Products Co., Long Island City, N. Y.

Metal office partitions—E. F. Hauserman Co., New York
Miscellaneous ironwork—A. P. Williams Iron & Bronze Co., New York

Wood doors—Jacob Froehlich Cabinet Works, New York
Fire doors—J. G. Wilson Corp., New York

Hollow metal doors—Superior Steel Door & Trim Co., New York

Hardware—Russell & Irwin, New York

Roofing and sheetmetal work—New York Roofing Co., New York

Metal decking and smoke baffles—H. H. Robertson Co., New York

Painting—J. I. Hass, Jersey City, N. J.

Glass and glazing—David Shuldiner, New York

Plumbing—Fred Brutschy Co., New York

Heating—John Winkel, Larchmont, N. Y.

Ventilating—Johnson & Morris, New York

Electrical work—Lord Electric Co., New York

Sprinklers—Automatic Sprinkler Corp. of America, New York

(Continued from page 89)

as 500 cu.yd. of concrete. The maximum truck-mixer fleet on these occasions comprised eight units. Operating under union regulations of the New York Metropolitan District, laborers on the job worked an 8-hr. day and carpenters a 7-hr. day. Concrete forms were lined on exposed surfaces with plywood of plycrete grade; 7/8-in. t.&g. lumber was used for the other faces in form construction.

Steel Erection

To erect more than 4,700 tons of steel frame for the building in seven 40-hr. weeks (including 13 8-hr. days lost because of bad weather) the Bethlehem Steel Co. employed six crawler cranes with booms 70 to 80 ft. long. A separate contract for fabrication and erection of the steel had been awarded to Bethlehem by Republic Aviation early in November, and the first steel arrived on the job 10 days before erection began. This anticipation of requirements contributed greatly to the advanced scheduling. The building frame required nearly 60,000 field rivets.

Roof Sheathing

More than 1,500,000 b.-ft. of 2-in. t.&g. fir and pine sheathing was placed and nailed to wood nailers (bolted to the purlins on the ground in advance of erection) in four weeks, a total of 140 working hours, by a force of 75 journeymen carpenters and four foremen. A battery of five A-frame derricks equipped with Dobbie winches hoisted the material to the roof. To speed the hoisting, the contract employed three Black & Decker 1-in. electric drills equipped with special sockets to fit over square ends of the winch

(Continued on page 92)

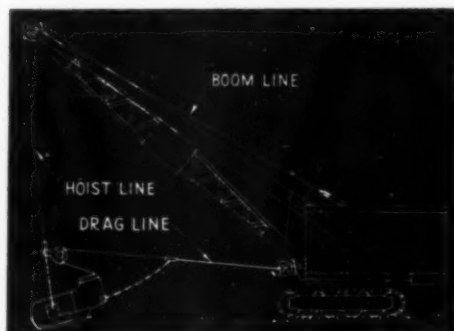
SOME TIPS

on choosing EXCAVATING ROPE

If the utmost in service is to be obtained from excavating rope, its construction and type of center must be properly matched to the require-

ments of the job. The following suggestions, while not applicable to all conditions, will serve as a general guide in selecting excavating ropes:

TYPICAL DRAGLINE EXCAVATOR

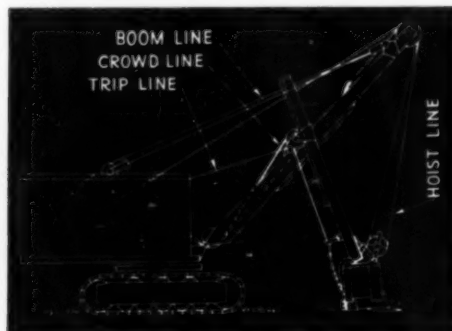


DRAG LINES are subjected more to wear than to bending fatigue. Therefore, the larger outer wires of a Bethlehem 6 x 19 Type U dragline are usually preferred. Lang Lay construction, Purple-Strand quality and IWRC are essential for this service.

HOIST LINES always travel over sheaves and are therefore affected by bending fatigue and crushing. Purple-Strand, Form-Set, 6 x 19 Type W, IWRC is recommended. Lang Lay is usually best.

BOOM LINES are more or less stationary. Ample strength is the main consideration. A Purple-Strand, 6 x 19 Type W rope, regular lay, IWRC or hemp center, is standard.

TYPICAL POWER SHOVEL



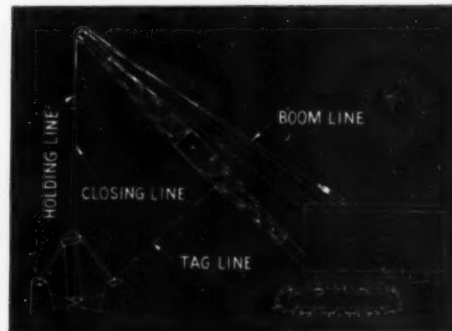
HOIST LINES must stand up under severe bending. They encounter some wear and are subjected to severe shock loads. Typical selection is a Purple-Strand, Form-Set 6 x 19 Type W rope, Lang Lay and with an IWRC.

BOOM LINES—See under Dragline Excavators.

CROWD LINES encounter bending, shock loads, wear. Purple-Strand, Form-Set, 6 x 19 Type W, Lang Lay and IWRC is often used. Some shovels require 6 x 37 flexibility.

TRIP OR DUMP LINES—8 x 19 Plow Steel, hemp core, regular lay, is satisfactory on small shovels; 6 x 19 Type W is preferable on large ones.

TYPICAL CLAMSHELL CRANE



HOISTING LINE—6 x 19 Type W Purple-Strand rope, regular lay, hemp core, is usually recommended.

HOLDING AND CLOSING LINES often encounter severe bending and severe crushing. The 6 x 19 Type W construction is usually used. IWRC is generally required. Invariably the rope is regular lay, Purple-Strand. Usually it is Form-Set.

BOOM LINES—See under Dragline Excavators.

TAG LINES—Generally 8 x 19 Plow Steel, regular lay, hemp center lines are used.

Bethlehem produces a full line of ropes for all types of excavating. These ropes are quality built, through and through. Their performance on your job will convince you of their economy and full dependability.



BETHLEHEM STEEL COMPANY

WELLPOINTS for POWER



From coast to coast power plants are being rushed to completion to meet the country's increased need.

On 21 of these new plants MORETRENCH WELLPOINT SYSTEMS have speeded foundation operations and lowered costs by enabling the contractors to work IN THE DRY!

For details on the finest pumping system made, write us.

MORETRENCH CORPORATION

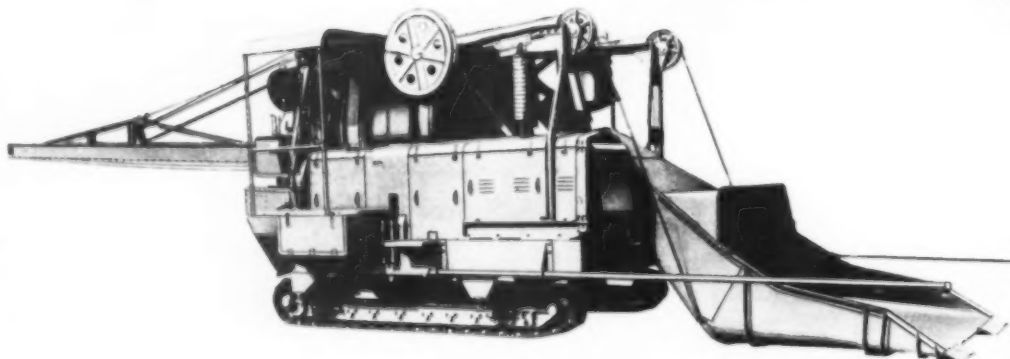
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ROCKAWAY, N. J.

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NEW ORLEANS, LA.

The Ransome 34^E Single Drum Paver



Here is what it means to you!

- 26% more concrete from every batch.
- 20 1/2% less batches per given yardage.
- Longer boom—reaches those inaccessible spots.
- 20 1/2% less trips of boom bucket.
- More crawler per ton of paver—less ground pressure.
- Hydraulic control means smoother, faster operation of boom swing and better spreading action.

Write for



Literature

RANSOME

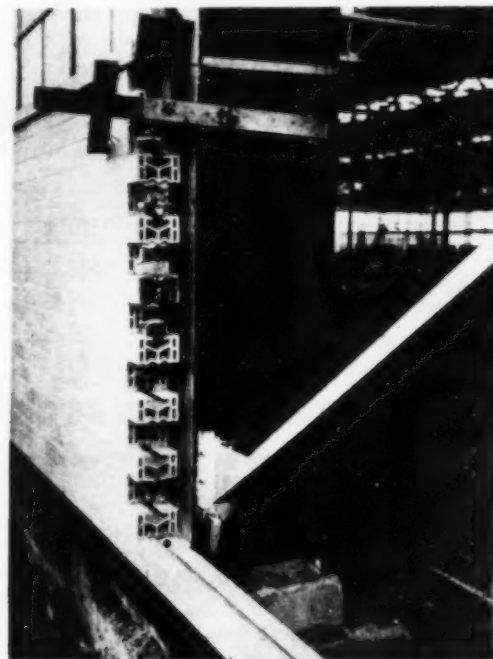
CONCRETE MACHINERY COMPANY
Dunellen, New Jersey

(Continued from page 90)

shafts. Three portable Homelite 1,800-w. generators furnished the electric energy to operate the drills used for hoisting lumber. Five more of these generators supplied power for other tools such as additional drills and Stanley electric saws employed by the carpenters.

Wall Tile

Walls 7 ft. high under the steel sash are built up with Natco Dri Speedwall unglazed tile designed with an open top slot and an inner water channel to intercept any moisture that works into the wall joint and thus prevent the water



WALL TILE designed with open inner channel to intercept joint seepage provides dry 7-ft. curtain from grade beam to sill under sash.

from bleeding through to the other side. In laying the tile mortar is buttered on the upper fins or flanges of the course previously laid, keeping the center channel clear. Walls of the assembly building required nearly 123,000 tile units, 12x5x8 in.; the wall is 8 in. thick. As the sixteen bricklayers employed on the job were not familiar with this type of tile, they required a little time at the start to master the technique of laying the units. Once the art had been learned, laying proceeded with the same speed as with ordinary, more familiar types of tile.

Toilet rooms are lined to a height of 7 ft. with a wainscot of Hanley glazed tile. The job calls for nearly 17,000 units of this tile, most of them in the 12x5x4-in. size.

Sash and Glazing

Steel sash in the building is fitted with outside angle clips designed to hold wood strips to which metal blackout shutters may be screwed, if necessary in the future. The wood strips and shutters are not included in the present contract. In the south, east and west elevations of the building the sash is glazed with Aklo non-glare, rough heat-resistant glass, 1/8 in. thick, acid-etched both sides; this glass has

(Continued on page 94)

LION

Naturalube

FOR DIESEL AND HEAVY DUTY

**D.H.D.
OIL**

NEW IMPROVED SUPER-LUBRICANT

TESTED AND
APPROVED BY
LEADING ENGINE
MANUFACTURERS

BRUSCH-SULZER BROS. DIESEL ENGINE CO.

FULTON IRON WORKS CO.

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ALLIS CHALMERS MANUFACTURING COMPANY

CATERPILLAR TRACTOR CO.
Caterpillar
PEORIA, ILLINOIS

Lion Oil Refining Company
El Dorado
Arkansas

GENTLEMEN:

This is to certify that NATURALUBE DHD
a Diesel engine lubricant marketed by LION OIL REFINING COMPANY, has successfully
met the test requirements of Caterpillar Tractor Co. and that
LION OIL REFINING COMPANY is hereby permitted to use the
following certificate respecting the suitability of said lubricant as a superior lubricant
for "Caterpillar" Diesel engines:

CERTIFICATE

herby certifies that its

LION OIL REFINING COMPANY NATURALUBE DHD
Diesel Engine Lubricant, known as NATURALUBE DHD
has been subjected to standard tests prescribed by Caterpillar Tractor Co. and that said
lubricant completely met all of said test requirements and is a superior lubricant for
"Caterpillar" Diesel engines. Said tests were completed in approved manner labora-
tories under the supervision of technical experts satisfactory to Caterpillar Tractor Co.

Dated MAY 5, 1941

By A. F. Reed
Vice President

By Mark
Vice President

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Removes Hard Carbon

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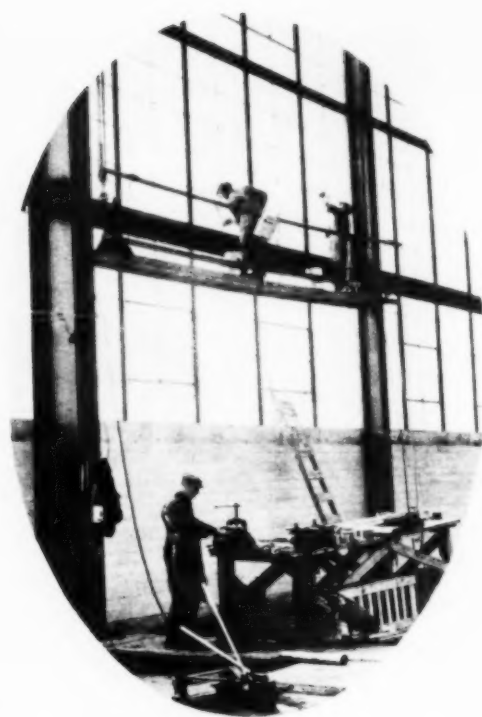
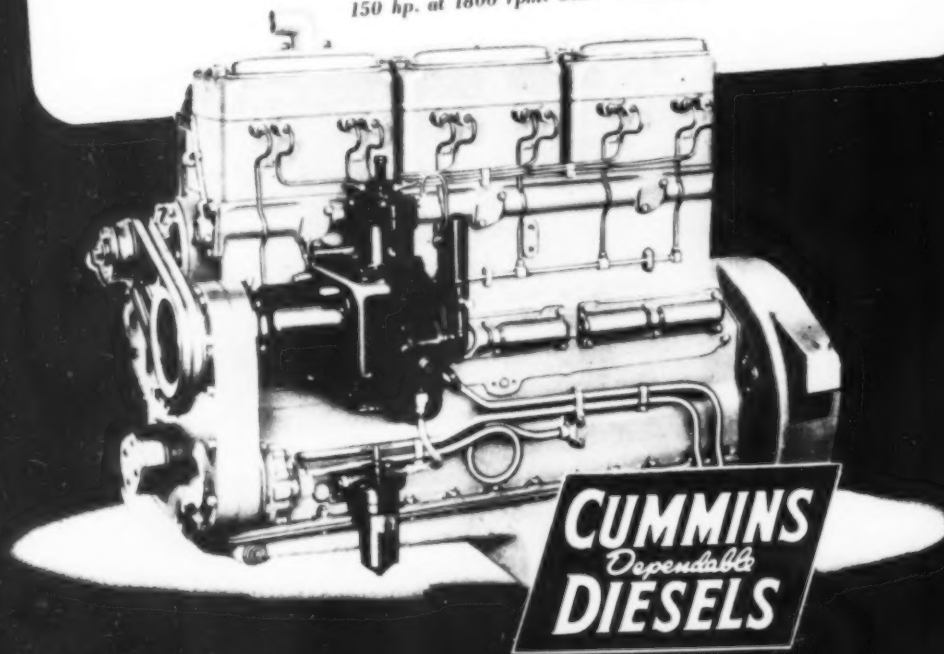
Naturalube D. H. D. is made from a rare and basically different crude oil which imparts to the finished product a 3 to 10 times stronger protective film . . . greater adhesiveness and penetrativeness . . . and ability to remove hard carbon deposits. By special processing, Naturalube D. H. D. is reinforced or fortified to resist the deteriorating effects of extreme heat and oxidation. Results — engines are cleaner; rings and valves operate more freely for longer periods; no clogging of filters, screens or oil lines (i.e. clogging attributable to oil). There is no hard-carbon scuffing; general engine performance is greatly improved; operating and maintenance costs are lower; shut-down time is minimized. D. H. D. is non-corrosive — safe. It saves wear, adds power and saves fuel. Try D. H. D. — Your money back if you don't believe it to be the best oil you ever used!

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ALL-OUT EFFORT THE MIRACLE WORKER

Miracles . . . you see them on every hand . . . in new factories, ordnance plants and cantonments which spring up overnight . . . in every-day feats of supply, transport and construction which are making America "the arsenal of the democracies." These miracles are not the product of anyone's magic wand, but of the all-out effort of industry and the men in industry who know how to do a job—do it fast and do it well. These men have learned that *knowing how* means—first of all—knowing what type of power to choose for the job . . . what kind of power will assure the greatest dependability and the highest productivity over the longest period of time. Experience has proved that Cummins Diesel power meets these requirements best and that's why the men who know how consistently and repeatedly specify Cummins Dependable Diesels for National Defense power needs. Cummins Engine Company, 1716 Wilson Street, Columbus, Indiana.

Illustrated: Model HBI-600 Cummins Dependable Diesel, 150 hp. at 1800 rpm. Other models from 33 to 325 hp.



GLAZIERS on hanging scaffold putty lights of colorless hammered glass in north wall.

(Continued from page 92)

a blue color. The north side is glazed with $\frac{1}{8}$ -in. thick colorless hammered glass.

Gunite Curtain

To apply a 2-in. Gunite curtain to the ends of the monitors and to the building walls from the roof cornice down to the steel sash, the Cement Gun Co., subcontractor, employed two of its own machines to shoot the mixture of sand, cement and water against a plywood backing, which was later stripped. Wire mesh reinforcement was embedded in the Gunite curtain. A total area of 46,000 sq.ft. was completed by the two crews of the subcontractor in about five weeks.

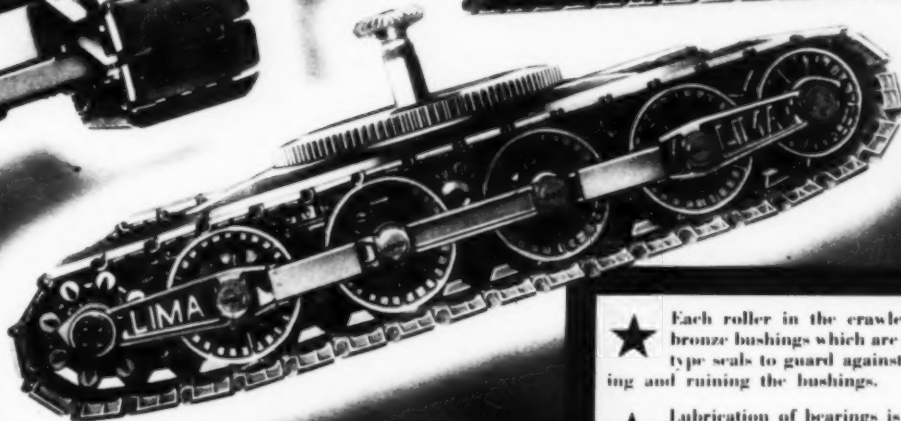
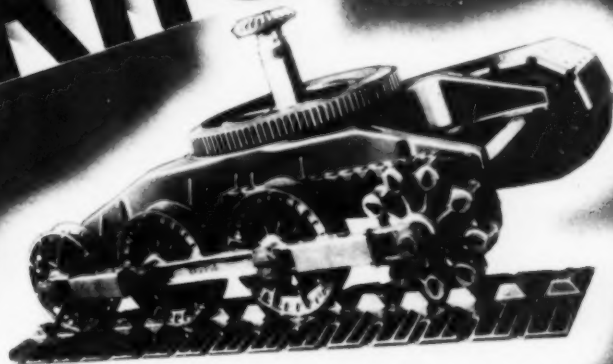
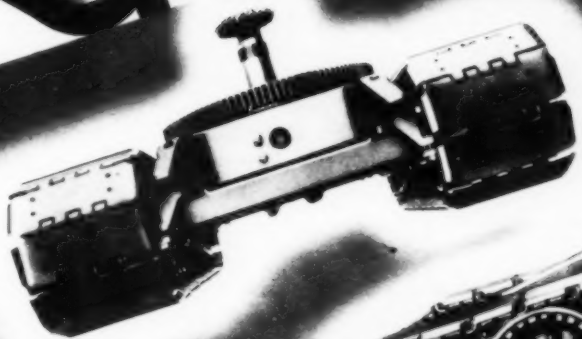
Hard-Surfaced Floor

Flat-slab floor over the basement section was given a heavy-duty machine-finished surface by Brennan & Sloan, subcontractor. A $1\frac{1}{2}$ -in. topping of cement and sand in 1:2 specified proportions first was struck off level with the screed boards and was compacted with a power roller, manually controlled. The surface then was screeded for the second time and was given a second power rolling, followed by floating with rotary power units. As the final step, the surface was covered with a scattering of Master Builders hard surface iron at the rate of 30 lb. per 100 sq ft., and this material was worked into the concrete with power floats, followed by three hand trowelings with steel trowels. Two Sure Lite gasoline-electric generators, a 17.5-kw. unit on wheels and a 15-kw. plant set up on blocks, supplied power to operate five Kelly mechanical floats and a 1,000-lb. roller designed by Brennan & Sloan and equipped with a G.E. motor.

On the day previous to applying the topping to the rough-surfaced slab over the basement section, the concrete surface

(Continued on page 96)

do you know



YOU DON'T HAVE TO PICK YOUR PATH WITH A LIMA

LIMA

SHOVELS - DRAGLINES - CRANES

- ★ Each roller in the crawler is fitted with two bronze bushings which are provided with piston type seals to guard against dirt and grit entering and ruining the bushings.
- ★ Lubrication of bearings is made easy through alemite fittings which extend through the ends of the axles, only a few minutes are required to service the entire crawler.
- ★ A simple arrangement for adjusting the crawler belt is located on the ends of the truck axles where access is easy.
- ★ The large diameter rollers keep the truck bushings high out of the mud. They are few in number and require less attention than the small multiple type roller.
- ★ The drive chains are easily adjustable and are located back under the crawler treads where they can not come in contact with obstructions of any kind.
- ★ The self-cleaning principle of the drive rollers, prevents mud and dirt from interfering with the propelling mechanism, thus assuring smooth, trouble-free travel at all times.
- ★ Extensions can be applied to the standard crawler to increase the ground bearing area and effect greater stability when machine is working on soft, uneven ground. Extensions can be applied in the field.
- ★ Each tread is hinged across the full width on heavy steel pins passing through multiple lugs.

Regardless of the position of the crawler belt, either crawler belt can be disengaged for turning in a wide or short radius.

The crawler truck is equipped with an efficient truck lock that prevents the machine from working back when machine is digging or working on a grade.

The LIMA crawler truck is designed for earthmovers who can not tolerate travel delays. It is strong and rugged, with speed and flexibility to enable it to master any ground condition a shovel, dragline, or crane may encounter. Make your next excavator a LIMA. You will like its ruggedness and speed and the way it can be maneuvered over rough, uneven ground and in close quarters.

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SAN FRANCISCO CALIF LOS ANGELES CALIF PHILADELPHIA PA MEMPHIS TENN
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101 BATCHES of Concrete per Hour!

WATTS BAR DAM—The Smith Tilting Mixers at Watts Bar Dam are living up to their excellent reputation established at Boulder Dam, Tygart Valley, Marshall-Ford and other big projects. With a 90 second mixing period, the three Smith 56-S Tilters actually produced concrete at the rate of 101 batches per hour — the maximum theoretical capacity of the plant — and these dependable mixers have kept up this tremendous production day after day. Again we ask you — could any other concrete mixer give such service?

The T. L. SMITH COMPANY
2851 N. 32nd STREET
MILWAUKEE, WIS.



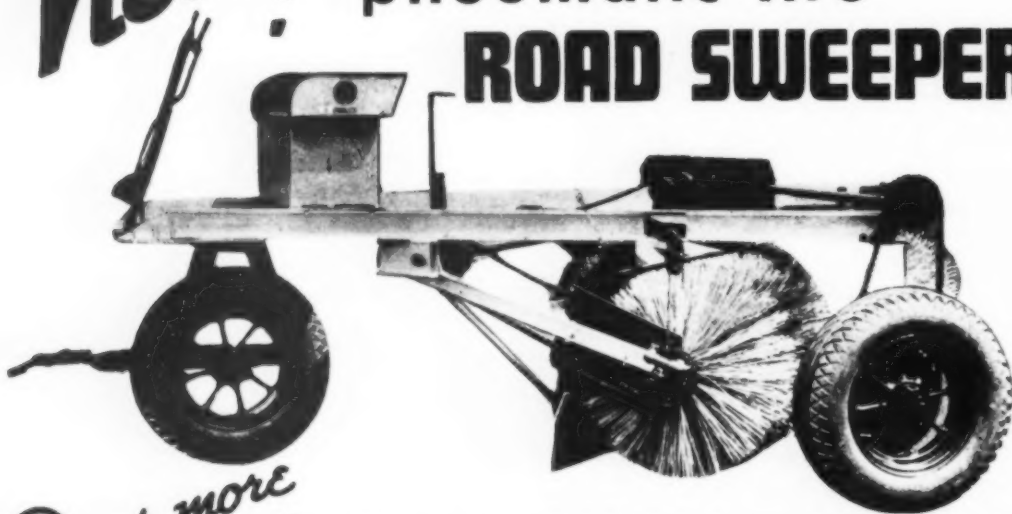
Battery of three Smith 2-yd. Front-End Charging Mixers at Watts Bar Dam.



SMITH MIXERS

USED ON THE WORLD'S GREATEST CONCRETE PROJECTS

NEW! Reliance 3-WHEEL pneumatic tire ROAD SWEEPER



*Does more
in less time
for less
money!*

3-Wheel Chassis provides balanced, 3-point suspension. An extremely short turning radius, makes unit exceptionally easy to handle and steer. A new method of raising and lowering gives quick, easy positive control of broom. The frame is all steel construction...eliminates a considerable amount of unnecessary weight. The machine is simple, foolproof, durable and costs less to maintain. Send for Catalogs 10 and 28...for complete information about the RELIANCE line of Road Building, Maintenance and Quarry Equipment.

UNIVERSAL ROAD MACHINERY CO.

Kingston, N. Y., U.S.A.

DISTRIBUTORS IN ALL PRINCIPAL CITIES OF U.S.A.

(Continued from page 94)

was washed with a 1 to 10 solution of caustic soda to neutralize spots of aluminum paint dropped from above during the painting of the steel trusses. These spots, if untreated, would cause blisters and blow-ups in the topping. Following the caustic soda treatment, the rough surface of the concrete was thoroughly cleaned with hose streams at 250-lb. pressure. Before applying the topping on the next day, pools of excess water were brushed from the rough concrete surface, and a flush bond coat of grout was worked into the rough slab with brooms. The flush bond coat was placed just ahead of the topping.

No topping was added to 5-in. mesh-reinforced slab laid on the ground in the remainder of the building. After the slab had been floated with power floats, the metallic hardener was applied and worked in with power floats and two steel trowelings.

Job Supervision

Construction of the new aircraft manufacturing and assembly building, with its nearby boiler plant and other services, involves an expenditure of about \$3,000,000. For the Republic Aviation Corp., the work is under the direction of G. A. Meyrer, in charge of construction, assisted by W. A. Reid, construction engineer, and A. J. Kelly, field supervisor of construction. Paul W. Best is superintendent on the job for Albert Kahn Associated Architects and Engineers, Inc. The interests of the War Department, which approved a \$5,120,000 facilities agreement for construction and equipping of expanded manufacturing plant by Republic, are represented at the site by William Lukacs, construction inspector for the Army Air Corps.

Operations of the Turner Construction Co., general contractor, New York City, are directed on the job by Larry E. Gilmoie, superintendent; Nelson L. Doe is general superintendent in the New York office. For the Bethlehem Steel Co., M. L. (Bob) Carpenter was foreman in charge of steel erection.

★ ★ ★

Quick Dumping Devices

STEP UP OUTPUT OF TRUCKS

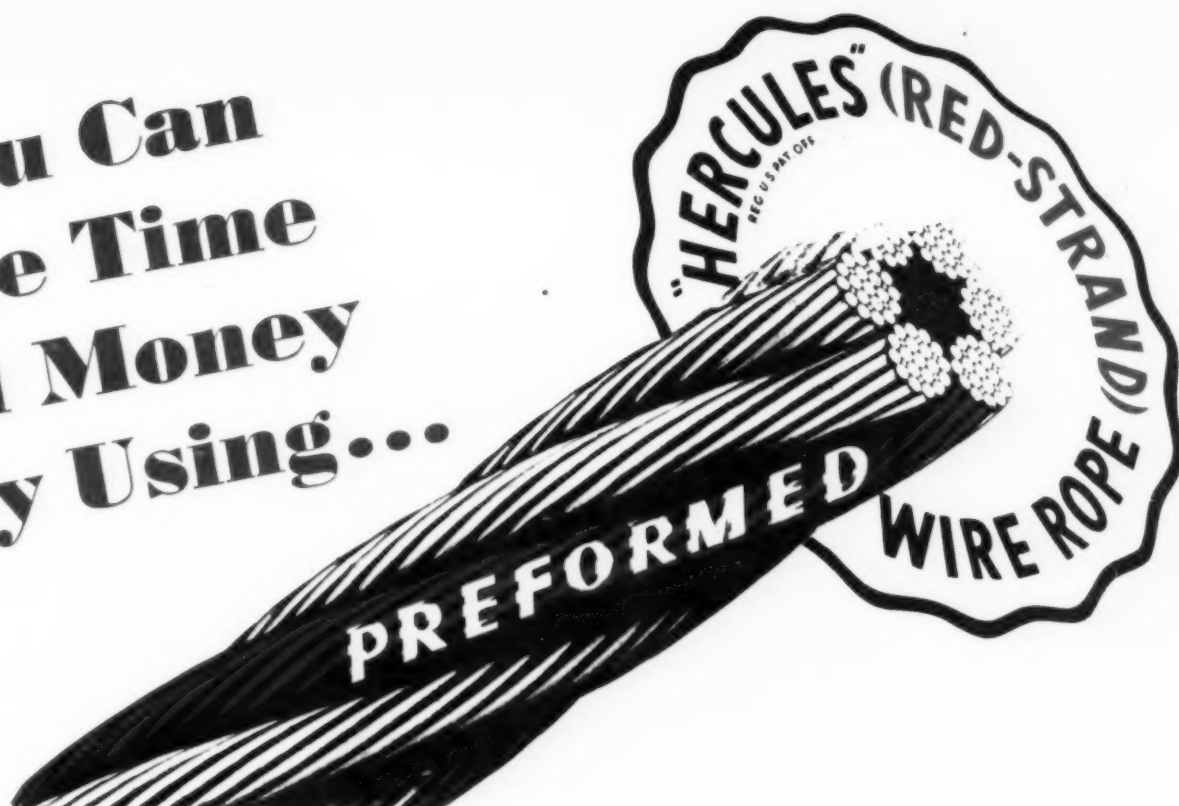
(Continued from page 68)

is operated by hydraulic pressure supplied by a pump geared to the truck's diesel engine. The mechanism is built by the Heil Co., Milwaukee, especially for the Macco Company, and is attached to the truck bodies at the San Francisco service branch of the Heil Co.

The Macco Company recently completed

(Continued on page 98)

**You Can
Save Time
And Money
By Using...**

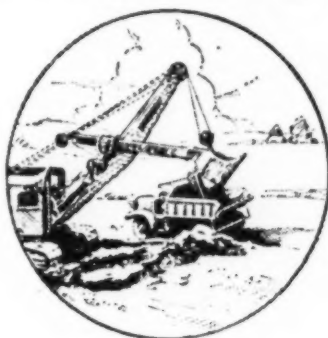


Now that continuous and efficient production is more important than ever, are you cashing in on the advantages of Preformed "HERCULES" (Red-Strand) Wire Rope? Actual records show that its easy handling, smooth spooling and long life mean a definite saving in both time and money.

When you buy Preformed "HERCULES" (Red-Strand) Wire Rope, you get a Preformed wire rope of the very highest quality — not only as to quality of material, but fabrication as well. As it is furnished in both Round Strand and Flat-tened Strand constructions,

there is a right rope for every heavy duty purpose.

Why not take advantage of the time and money saving possibilities of Preformed "HERCULES"? Try it, then compare its performance record with that of any other rope you have ever used.



We especially recommend the Preformed type of "HERCULES" (Red-Strand) Wire Rope for use on backfillers, bulldozers, carryall scrapers, clamshells, conveyors, cranes, draglines, dredges, hoists, shovels, skimmers and trench hoes.

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MADE ONLY BY
ESTABLISHED 1857
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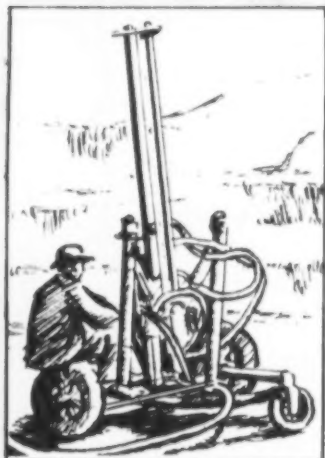
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TODAY'S Selections!

THESE THREE BRANDS OF

GOODALL Air Hose

COVER A WIDE RANGE OF SERVICE REQUIREMENTS



CONTRACTOR A—"I need the very best air hose I can buy—one I can absolutely depend on to stand up on tough, rough, high-pressure work. What is the best air hose Goodall makes?"

GOODALL SALESMAN—"SUBWAY" — a Goodall "Standard of Quality" air hose of "Balanced-Built", wrapped duck construction that gives equally long life to tube carcass and cover. Any size you want from 1/2" to 1 1/4", and any length up to 50 feet."



CONTRACTOR B—"I'm going to need long lines on this job, and a hose that can take a lot of dragging over plenty of jagged rocks."

GOODALL SALESMAN—"Those specifications point right to "MINE KING"—another "Standard of Quality" hose with a tough, extra heavy brown cover that can "take it." It has the new Goodall "White-Tite" friction between cords—a feature that permits great flexibility without breaking down the carcass structure—also an oil resisting tube. The 1/2" and 3/4" sizes come in lengths up to 500 feet; 1" size up to 250 feet."



CONTRACTOR C—"I don't need your highest priced hose on this job, but I do want a good, reliable air hose that will stand a lot of handling in long lengths."

GOODALL SALESMAN—"You can't do any better than our "37" Brand—one of the best hose values on the market today. It's a molded and braided job, with an extra tough, wear-resisting black cover; and it has strength and flexibility far greater than you would expect in a hose at '37's price. It comes in maximum lengths of 500 feet, in sizes 3/8" to 1 1/2"."

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Company _____

Address _____

(Continued from page 96)

a 650,000-cu.yd. excavation job for the Bethlehem Shipbuilding Co. on which these trucks delivered 15,000 cu.yd. per day, in three 7-hr. shifts, over an average haul of 1 1/2 mi. Subsequent jobs included 300,000 cu.yd. of rock to be moved for the Todd-California shipyard at Richmond and the removal, over a 5 1/2-mi. haul for the U. S. Navy supply base at Oakland, of 400,000 tons of rock. (On this last job all the bidding was done in tons). On all these jobs the material had to be drilled and blasted before it could be handled by power shovels.

★ ★ ★

Navy's

Huge Drydocks

BUILT IN DREDGED BASINS

(Continued from page 47)

units, and a tolerance was attained not exceeding 2 in. in any direction. The dock floor required 47 of these truss units.

The side-wall forms were built with the use of channels back to back for walers, and 1 1/4-in. bolts for tierods. The operation of building these was similar to the floor truss assembly, using two other welding sheds for the fixing of the corrugated sheeting to the channels. These sections weighed about 30 tons each, and were loaded off a dock parallel to the bottom form dock by a Manitowoc Speedcrane. A 1085 American Revolver crane on a scow placed the forms in the dock. There are 65 wall forms, averaging 36 ft. long, per dock.

Concreting Barges

For concreting the floor of the dock a steel car float 337 ft. long by 47 ft. wide was used. Eight Insley towers were erected at 19-ft. 3-in. centers. These had the regular Insley sliding frames to each of which was attached a 3-yd. hopper, from which, in turn, was suspended a 12-in. tremie pipe. Above these sliding frame hoppers and between alternate pairs was placed a 3-yd. hopper which, with a pants-leg below it, could feed either sliding frame hopper. This top hopper was fixed, and from each end of the pants-legs was suspended an Insley elephant trunk, which was removed or added as the sliding frame hopper went up or down.

Concrete was fed to the four top hoppers by four lines of 8-in. Pumpcrete pipe, which were elevated 41 ft. above the deck, so that at any time we could place concrete from any pipe into any hopper. This gave flexibility. If there was trouble at the

(Continued on page 100)



800 MILES FROM HOME OFFICE BUT COMPLETES BIG JOB AHEAD OF SCHEDULE

► Here was the picture ahead of D. W. Johnson, Inc., contractors from Newark, N. J., when they tackled a two-year dirt removal and seal wall flood control job in Indiana. They were operating 800 miles from headquarters. In attempting to better this two-year schedule they had to operate equipment 16 to 24 hours a day. That left little time for servicing and refueling—no time for breakdowns and delays.

They laid careful plans. Only new equipment was used—4 shovels, 10 tractors, and 7 trucks. They expected to use their own tank truck for servicing this equipment until they discussed their needs with a Standard Oil Automotive Engineer. They found that deliveries could be made when and where they wanted them—that Engineering Service was available at any time to help maintenance men keep the equipment on the job. They turned the whole problem of supplying fuels and lubricants over to the Engineer.

Then records began to fall—over 600,000 yards of dirt were moved in 90 days—250,000 gallons of gasoline and Diesel fuel were delivered to this equipment without one delay—equipment never lost an hour through failure caused by Standard Oil products or service.

Before you even bid on the next job in the Middle West get all the facts about this service that Standard Oil (Indiana) offers contractors. Just write 910 South Michigan Ave., Chicago, Ill. In Nebraska, write Standard Oil Company of Nebraska at Omaha.

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STANDARD OIL COMPANY (INDIANA)

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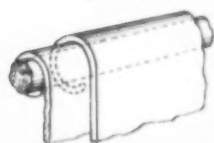
LOWERS
MILEAGE
COSTS

Lightens THE LOAD

FOR concrete work, Sterling Models S-17, S-18 and S-19 are selected by leading Contractors because of these outstanding features:

Perfect Balance 10-Spoke Wheels
Self-Lubricating Bearings
Welded Trays Heavy Tray Load
Malleable Wheel Guards
Channel Steel Legs
Square-Bent Leg Shoes
Hard Maple Handles Interchangeable Parts
Malleable Iron Wheel Brackets

Capacities 3, 3½ and 4 cu. ft. struck.
Complete stocks available from Warehouses and Distributors in principal cities.



An Exclusive Sterling Feature
Where tray sheets lap, both thicknesses are folded over the continuous butt-welded reinforcing rod, thus giving additional rigidity and strength.



MOST OF THE LOAD IS CARRIED ON THE WHEEL

Sterling Models S-17, S-18 and S-19 are also used for general purpose work, handling sand, gravel, brick, etc. In this service, they have a maximum capacity of 4, 4½ and 5 cubic feet, respectively.

STERLING WHEELBARROW COMPANY

MILWAUKEE, WISCONSIN

OWEN-EQUIPPED *Mobile units* **BOOST GRAVEL PLANT EFFICIENCY**



WHETHER it's shuttling up the track to the pile for a capacity grab of dry gravel, or just a matter of swinging the boom and dropping that OWEN into the water pit for a mouthful of drip-

ping aggregate,—one thing is certain; for greatest daily output with minimum operating cost "OWENIZED" mobile units are requisite.

The **OWEN BUCKET Co.**
6020 BREAKWATER AVE., CLEVELAND, OHIO
BRANCHES: New York, Philadelphia, Chicago, Berkeley, Cal.



(Continued from page 98)

batching plant, we could take concrete from any one of the pipes, and, if we needed a lot of concrete at a hopper at any one time, we could concentrate the discharge from as many pipes as we wished. Two 4-drum gas engine Lidgerwood hoists were used for the eight Insley sliding frames.

For tremieing the side-walls, another boat, 100x30 ft., was rigged in a similar fashion, with the exception that it had only two tremie lines, and these projecting over the rake of the scow.

Novel Tremie Method Devised

As everyone will testify who has undergone the travail and sorrow involved, the placing of tremie concrete is a headache, and where a large quantity, such as 300,000 cu.yd., is concerned, it can readily become a major catastrophe for the peace of the job. You must have an experienced and well-trained crew who know how to maneuver pipes and hold the losing of seals to the minimum, and even with a well-trained crew, the loss of a seal is not unusual. The loss of a seal means a structural flaw in the concrete, brought about by the inrush of water at the bottom of the tremie pipe, and by the jetting action when recharging the pipe for a new start.

On the tremie work for the drydocks the customary method of using a gunny-sack filled with straw or an excelsior was placed in the pipe ahead of the first concrete, was prohibited. Also, since the Navy in this type of work removes all concrete in the pour if the seal is lost, it became necessary to devise a method which eliminated the shortcomings of the ordinary tremieing procedure.

The novel and effective means developed for placing underwater concrete we call the "valve tremie process". It is easily applicable to any tremie job and, once working, is simplicity itself. These particular tremie pipes are 12-in. spiral welded 3/16-in. wall, made by the American Rolling Mill Co. They are welded flanged pipes, and when in position are 60-ft. long. A tremie pipe is attached to the 3-yd. hopper in the sliding frame. A 12-in. plug-cock valve, closed and opened by pipe control, is installed 35 ft. above the lower end of the pipe to serve as a gate. (The location of the valve is determined by the hydrostatic head to be overcome). Immediately below the valve an air-hose connection is tapped into the pipe.

In starting the pour for the tremie concrete the sliding frame with the pipe suspended from it is raised until the valve is out of the water. Then, with valve in closed position, the pipe and the hopper above it are filled with concrete. The sliding frame then is lowered until the bottom of the tremie pipe reaches the stone fill at the bottom of the dock. It is next raised about an inch to permit the free escape of the air and the descending concrete, and to eliminate the danger of back pressure from the compressed air which would arise if the pipe were firmly seated on the bottom. Two divers work on the concreting barge at all times and are responsible for the proper placing of the pipe in the

tremie forms. Upon the diver's signal that all is ready, the air valve is turned on. The valve and the plug of concrete above it prevent any air from escaping upwards, with the result that all water in the pipe below is ejected, and a bubble is formed on the bottom of the pipe of the same shape as that formed on the top of a glass tumbler by capillary action. The 12-in. plug-cock valve then is opened and the operator on the platform of the sliding frame opens the hopper, and keeps the concrete flowing until the pipe becomes full. This platform operator has a telephone connection to the engineer on the 4-drum hoist that controls the movement of his sliding frame. At his command, the engineer raises and lowers the hopper to permit the steady flow of concrete.

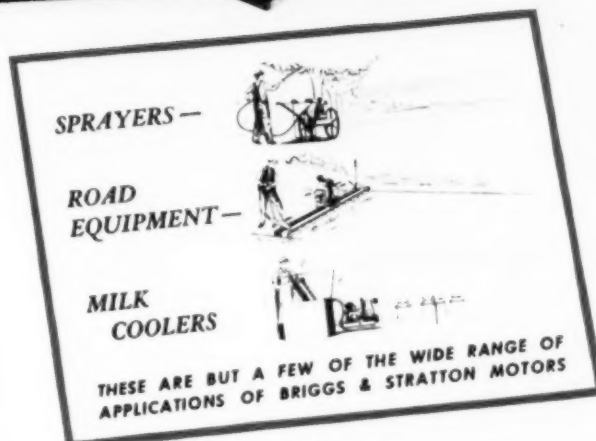
Tremie Placement Tested by Model—In order to test the scheme, a glass-inclosed scale model of the tremie set-up was built in a field laboratory, and the system worked out in detail. This accounts for the foregoing description of what happens underwater. In this laboratory we have used different colored batches of concrete in a comprehensive study of the spreading action of the concrete as the pour progressed. These studies served to alter our conception of the shape tremie concrete takes after it leaves the bottom of the pipe. We thought that the concrete coming out of the tremie pipe would burrow under the surrounding concrete, but our colored batches showed us (see accompanying photographic detail) that the succeeding concrete takes the form of plumes—that is, one on top of the other, with the last concrete being on top. After the procedure had been worked out, foremen, divers, and crew members who were to work on the tremie boats were called into the laboratory and put through a course of instruction to familiarize them with the system. Here each man learned the why and how of his specific duties, so that when we started tremie operation on the boat, he knew what was going on below water.

The efficiency of the new system is attested by the fact that not a seal has been lost up to this time, during which we have placed 130,000 cu. yd. of submarine concrete in 7 weeks. If a seal had been lost, it would have been a simple matter to regain it speedily without the usual danger of impairing the structure, as there would be no jetting action in making a new seal. While it is true that this method of tremieing will effect a tremendous saving in dollars, when multiplied over all the dock projects that the government now has under way, the time element reduction is of more vital significance. On similar docks, heretofore, it took hours to charge a tremie in a manner satisfactory to the authorities. By the valve tremie process, we do it in a few seconds by opening a valve.

Central Mixing Plant

Selection of a batching and mixing plant capable of handling 250 cu.yd. of concrete per hour, economically and with

(Continued on page 102)



Engineers . . .

Who Design Appliances, Tools and Machines Invariably Write Briggs & Stratton Motors Into Their Gasoline Power Specifications

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and with greater economy!*

Equipment that is not working on the job earns no money! This fact-filled manual, based on successful experience, was prepared for Engineers, Superintendents and Foremen of maintenance as a guide in helping them keep construction and road building equipment in efficient operating condition.

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OAKITE

MATERIALS METHODS SERVICE



CLEANING

FOR EVERY CLEANING REQUIREMENT

(Continued from page 101)

a minimum of labor, was a subject of intensive research and layout work. The plant installed has justified this care and forethought by more than living up to expectations in every respect.

To start at the point of material delivery, aggregates are freighted in by water in 1,000-ton scows from the Warner Co.'s plant at Morrisville, Pa., and transported from these barges into six 300-cu. yd. storage bins by means of a 1085 American Revolver crane, equipped with a 3-cu. yd. bucket. These hoppers are set over a 36-in. Jeffrey belt conveyor, 342 ft. long, and were installed in preference to stock piling in order to speed up bin charging and to facilitate heat control for winter concrete. All bins are equipped with steam jets.

Two of these bins are used for sand and four for coarse aggregate, which consists of river gravel graded down from 1½-in. commercial size. The lateral conveyor under these bins feeds into a transfer house and then, at right angles, on to a 447-ft. riser belt with a vertical lift of 35 ft. This riser belt discharges into a four-equal-sized-compartment, 517-cu. yd. Butler bin. One compartment of the bin is for cement, one for sand, and the other two for gravel. This bin was erected on the transverse center line of the dock and set back on piling about 90 ft. from the top of slope. Bulk cement is delivered in bottom-dump railway cars and transferred by twin-screw conveyors to two 250-bbl. per-hour Rex bucket elevators, which carry it to the top of the bins. When the cement bin is full, the overflow goes into a 3,000 bbl. ground storage bin which is set over the conveyor flights.

Three Dual-Drum Mixers

The concrete plant is equipped with automatic Butler 4-beam scale and weigh batchers for charging three 34-E Koehring dual-drum mixers, which in turn top four 200-double Pumpcrete machines. Each of the three mixers is so arranged that it can be discharged into either of two adjoining Pumpcrete pug-mill remixers by means of a swinging spout. All the equipment is electrically powered and, so far as possible, automatically controlled. This plant, on a 1½-min. mix, has a capacity of 260 cu. yd. per hour, providing a safety factor which will allow a pour to continue at normal speed in the event of a mechanical breakdown with any one batching, mixing or pumping unit. To date there have been no mechanical difficulties and, with the trained crew we now have, we do not expect any.

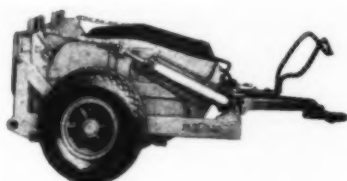
Pipe Line Transportation of Concrete

Concrete is pumped through 8-in. pipe lines up to 1,000 ft. in length, to the receiving hoppers set above each pair of tremie pipes on the tremie barges. Allowing for the elbows and the vertical lift, we have pumped up to a horizontal equivalent of 1,450 ft. Individual pipe lines have

(Continued on page 104)

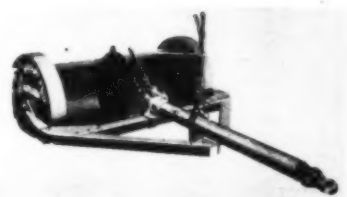


Baker Bulldozer on Harris County, Texas, flood control project.



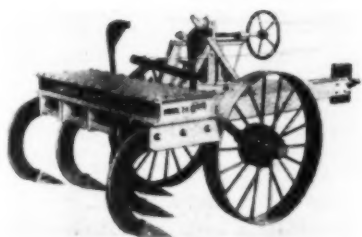
HYDRAULIC SCRAPERS

Three easy loading models—3, 4 and 6 cu. yd. capacities for any tractor.



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Automatic, Full revolving—in 5, 6 and 7 foot sizes for any tractor.



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ROAD DISCS, MAINTAINERS
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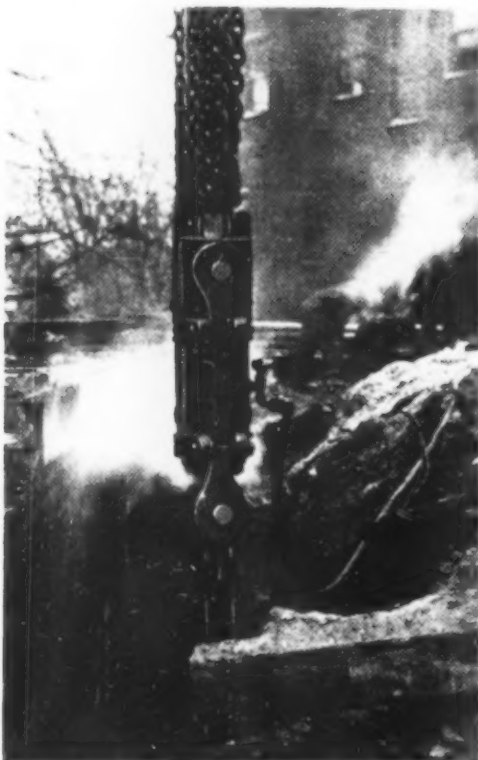
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Jobs More Quickly
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Get the facts on correctness of principle and mechanical features that make Vulcan the modern economical pile extractor.



VULCAN IRON WORKS
Since 1852
331 North Bell Avenue

Chicago



Illinois

(Continued from page 102)

a 10-ft. flexible section from shore to barge, in order to compensate for the rise and fall of the tide.

The concrete pump and pipe line system was readily adaptable to this job as it gave a uniform and continuous distribution of unsegregated concrete at the tremie hoppers. However, the outstanding advantage of the pumping system lies in the coordination that can be effected, as there is no confusion or interference between the place of manufacturing the concrete and its point of deposit. This point will be more readily appreciated when it is understood that the entire job was so laid out that the location of each working unit, such as the concrete boats, the piledrivers, the stone scows, and the derrick boats, was designated and coordinated months in advance. A typical day's diagram is shown herewith.

For the construction of Dock 5, the concrete plant will be moved to the center line at the head of the docks, and two more concrete pumps will be installed as boosters.

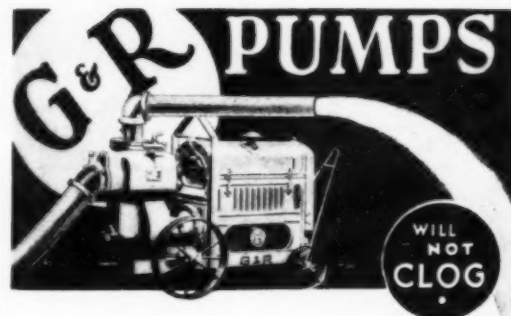
Concrete Progress

Except for the first day, when the more or less usual difficulties that arise in coordinating various plant operations were encountered, each pour was made on schedule. Production was stepped up rapidly until we reached the peak of 3,600 cu.yd. in a day. However, this rate was crowding the form design, and we stepped down to a schedule of about 2,700 cu.yd. daily.

Two sections of bottom forms were poured daily in two 8-hr. shifts—that is, one section, containing 1,000 cu.yd., per shift. Concreting on the wall pours progressed around the clock. These wall pours are 36 ft. long, 15 ft. wide, and 44 ft. high, and require approximately 850 cu.yd. each. The wall sections were poured at the average rate of 60 cu.yd. per hour with one Pumpcrete, while at the same time work was carried on with three machines on the bottom slab. After the slab was completed a second pumping unit was cut into the wall pours in order to get the full output of one 34-E dual-drum mixer. We could, therefore, increase our production to approximately 80 cu.yd. per hour for finishing the wall pours.

Pour operations started March 4, 1941. The exact quantity of concrete required to complete the job has not been determined, as we are still designing the quay wall and the service building, but the total quantity will probably be in the neighborhood of 500,000 cu.yd.

Five dredges have been placing back-fill outside the walls and steel sheeting of Dock 4. The cofferdam cut-off at the 860-ft. mark is rapidly nearing completion. The program schedule provided for pumping out the foreshortened drydock and resuming concrete operations on the lining and top-wall lifts in July. It is a point of justifiable pride that the entire organization has functioned as a well oiled machine in stepping up the tempo of an already exacting construction schedule. In our relations with the Navy there has



The Most DEPENDABLE Pump For The Least Money

Claims of fastest priming, highest suction lift, more gallons per minute, etc., do not pump water. On the job, the pump must do its own talking, and with dirty water, many a pump is inclined to stutter—and stop.

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There's a Simplex Jack for every construction job—every one a time-saver and cost-cutter—see them all in new Catalog 41. Send for a copy today!

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Better, Safer Construction Jacks Since 1899

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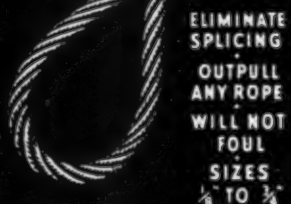
Hydraulic for easier cap lifting.

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WIRE ROPE CLAMPS
mean you will protect
your employees lives and
save money by eliminat-
ing costly delays due to
the biting action of old
style clamps, causing the
wire rope to break far be-
low its actual strength.
Insure against loss of
equipment by STAND-
ARDIZING on SAFE-
LINE today. Made to fit
all right lay ropes.



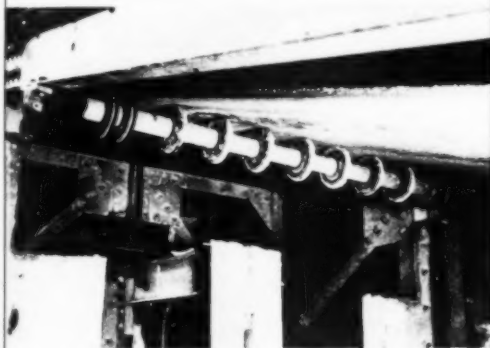
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OUTPULL
ANY ROPE
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WIRE ROPE CLAMP

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Robins RUBBERDISC Return Idlers (Patented) evenly support the return strand of a conveyor belt. Sticky material cannot build up on the discs and this, plus the gentle "rubber to rubber" contact, protects the belt and prolongs its life. RUBBERDISC Idlers also withstand abrasive and corrosive action better than ordinary metal idlers.

Write right to Robins. The names of these and other pleased RUBBERDISC Idler users supplied on request.

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CONVEYING BELT COMPANY
PASSAIC, NEW JERSEY

been no evidence of red tape, but a strong desire to get the work done. To this end we have been blessed by having the closest kind of cooperation. By early Autumn, Uncle Sam will be laying a new keel.

Personnel

For the Navy Department the key personnel on the Philadelphia drydock project includes Rear Admiral A. C. Watson, commandant, Philadelphia Navy Yard; Capt. Gaylord Church, district works officer; Commander W. Z. Kline, assistant public works officer; and Lieut. G. T. Lowe, resident engineer officer in charge. Frederic R. Harris, Inc., and Dry Dock Engineers acted as consulting engineers.

The organization of the contractor, Drydock Associates, comprises Frederic B. Spencer, project manager; D. B. Young, job manager; William Denny, general superintendent; James T. Denton, chief engineer; W. O. Keehn, engineer and superintendent of structural steel; W. F. de Leon, office manager; Byron Hunicke and Jack Aroyan, in charge of design; Joe Wigmore, in charge of architecture; Harry Hinkel, dredge superintendent; George Holmes, mechanical engineer; Art Ruge, engineer of Executive Committee; Joe Durfee, chief of field parties; Walter Carter, chief accountant; Frank Smith, electrical engineer; and Chris Knoeller, paymaster.

★ ★ ★

NAVY

DRYDOCK AREA

Drained With Well Points

(Continued from page 63)

down, on 6-ft. spacings at the start, and connected to the headers. This plan was followed in each of the three successive stages. The third stage, required for only a part of the entire dock area, extended to El. —61 or about 71 ft. below original ground surface.

The ground was much too hard to permit of putting down the well points with the aid of jet pipes alone and it was decided first to sink well casings that would not only facilitate getting well points into position but would make it possible to place porous material around them. At first an attempt was made to jet these casings down, then a rotary drill rig was brought in, teeth were made on the bottom of the casing which was put down as in well-drilling practice. Various expedients were tried until the time of putting down these casings was reduced from 2 hr. to about 9 min.

The best method (used on the latter

(Continued on page 106)

8 DAYS SAVED ON PILING JOB WITH Steel MONOTUBES

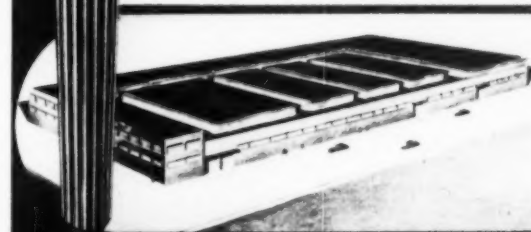


● Approximately 1700 Monotubes were driven for this new Orders & Stores Building of the General Electric Co. at Schenectady, N. Y. The piling contractor finished the job 3 days ahead of the regular completion date without using a 5-day time extension which he was entitled to due to bad weather.

How did Monotubes contribute to this 8-day saving? (1) These light, strong steel casings lend themselves to speedy handling. (2) Driving time is reduced because Monotubes require no mandrel and can be driven by standard crawler crane equipment. (3) Every casing can be inspected quickly and thoroughly prior to filling with concrete.

Monotubes are available in gauges, tapers and lengths to meet varying soil conditions—and Union Metal engineers are ready to give you constructive help with your piling problems. Write for Catalog No. 68A.

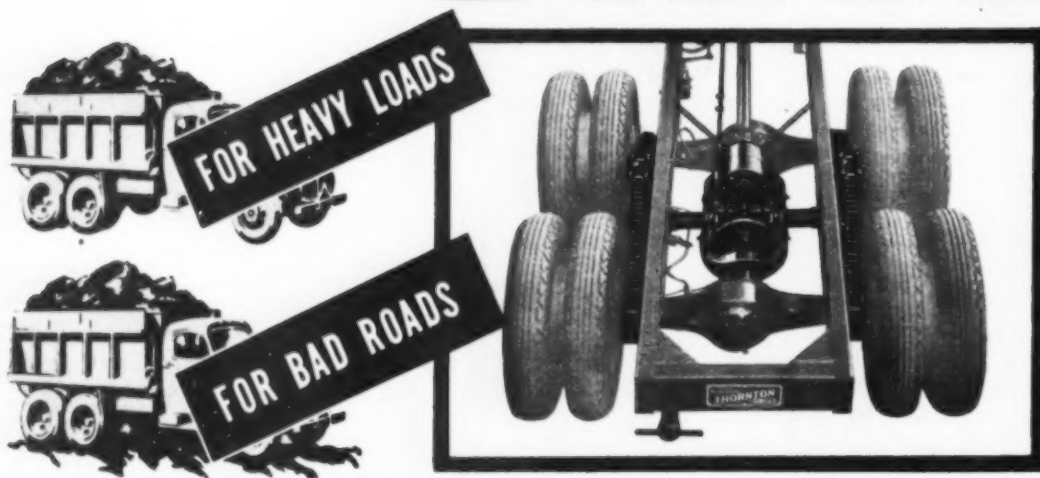
Architect: Albert Kahn Associated Architects and Engineers, Inc., Detroit, Mich.
Piling Contractor: Kelly Pile & Foundation Corp., Brooklyn, N. Y.



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MANUFACTURING CO.**
CANTON, OHIO

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4-REAR-WHEEL DRIVE



In these days when *transportation* must sustain the heavy demands of defense and industrial programs, THORNTON Four-Rear-Wheel DRIVE is rendering a tremendous service in scores of industries. With its application to trucks up to 3-ton rating, it supplies double the tractive effort and more than twice the payload capacity.

***This unit is giving vital aid
in solving defense transportation problems.***

Engineered particularly to meet YOUR requirements, your THORNTON-equipped trucks will carry their bigger loads faster, more economically and, if necessary, through tougher going. "Walking-Beam" dual suspension reduces shock on load and road.

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Manufacturers also of the THORNTON automatic-locking DIFFERENTIAL

"When you need TRACTION you need THORNTON"

(Continued from page 105)

part of the work) employed a drill consisting of a 25-ft. length of 8-in. i.d. casing, $\frac{1}{2}$ in. thick with 400 lb. of lead in a bell-shaped head and a special bit or tip on the bottom. This tip was formed by drawing the sides in to form an inverted cone with a $1\frac{1}{4}$ -in. central opening for the water jet. Around this opening were projections on either side, curved in opposite directions, as in the "fishtail" bit used in oil-well drilling.

In the yoke of the drill rig, by which rotary motion was imparted to the bit, slots were made to fit a pair of keys or splines that were welded on outside of the drill for the full length. Thus the drill could slide downward in the yoke as both rotated. The rotary motion dug the fishtails into the ground and material loosened thereby was carried upward around the outside of the pipe by air and water escaping through the central hole. Both water and air were fed into the top of the drill at about 85 lb. per sq.in. through a head that permitted pressure to be maintained while the bit was rotated. Escape of material around the drill helped to enlarge the hole so that when the casing had been put down to full depth and withdrawn, the drill's overall dimension of 10 in. (9 in. o.d. plus twice the thickness of the $\frac{1}{2}$ -in. splines) was found to have opened up a hole about 12 in. in diameter.

When the drill was pulled, the drill rig moved ahead to the next hole, 4 or 6 ft. away, and while this new hole was being dug a boom from the rear of the rig was used to put down a casing in the hole just drilled. Because of the preparatory work done, this casing went down readily enough with the aid of water under pressure admitted, as in the drill, at the top. Water escaping around the bottom carried with it material from within. The casing was thus left clear for insertion of the well point and riser pipe around which No. 14 gravel and coarse sand was then poured until the casing was full. Finally, the casing was withdrawn leaving the riser in a gravel-filled well, ready for connection to the header.

Header Pipes

Having half couplings welded to the top of the header at 2-ft. intervals made it convenient to connect the $1\frac{1}{2}$ -in. risers to the header regardless of exact riser spacing. The 2-ft. coupling spacing made it possible to start with risers 6 ft. apart and later to put down intervening risers on 2- or 4-ft. spacings if necessary. The headers themselves, supplied by the Chester Steel Co., are 8 in. in diameter, of $\frac{5}{16}$ -in. steel plate; stop-cock and union are put in each riser connection. Header connections are Dayton couplings.

The headers are divided by gate valves into lengths in which 50 to 80 well points are operative, each section served by a Stang well point pump unit. The latter is a 55-hp. Hercules gasoline engine operating a centrifugal pump of special design which has directly connected to it the vacuum pump already mentioned. The

(Continued on page 108)

Ask yourself this one:

WHAT'S THE MOST EXPENSIVE DRINK IN THE WORLD?

ANSWER: It's a glass of water drawn from the kitchen tap in any one of thirteen cities in Southern California.

That drink traveled more than 300 miles. Cost \$220,000,000 to produce. And may have originated in New Mexico, Colorado, Wyoming, Utah, Nevada, Arizona or California.

It's part of the gigantic project to carry Colorado River water across the mountains and deserts to the dry, but fertile lands of Southern California. It's the biggest power-water-irrigation-flood-control job ever undertaken—a tribute to engineering genius. The pictures below will help to give you an idea of the immensity of the job.



Boulder Dam provides the power to lift the river over the mountains...



The water is stored in this huge, man-made lake more than 115 miles long...

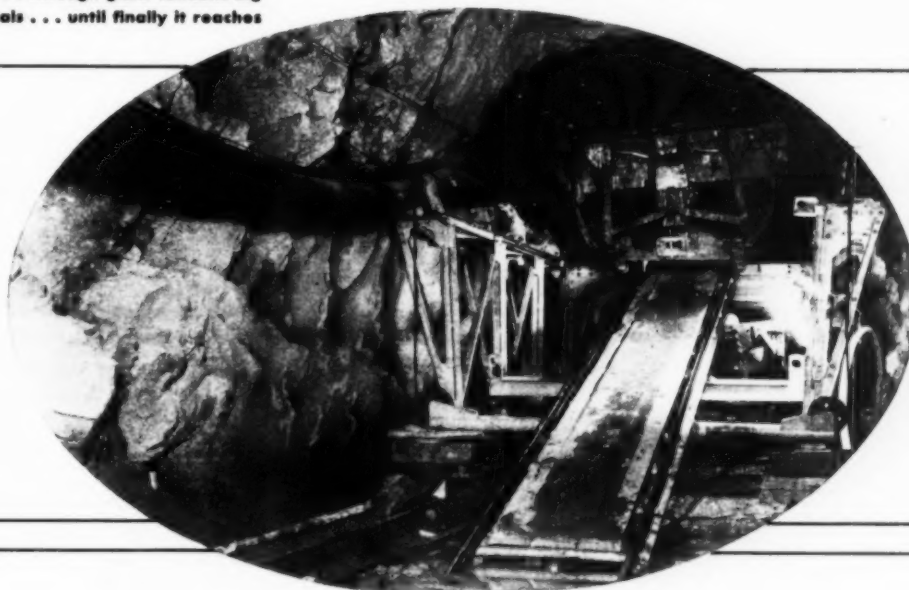
It travels through tunnels bored out of solid rock... through giant conduits big enough to hold a moving van... through open canals... until finally it reaches



Its destination, cool and sparkling... a never-ending supply for Southern California.

DU PONT supplied the "Ventube"[®] ventilating duct used for providing adequate ventilation for driving a large part of the many miles of rock tunnel on the project. We point this job out, as one in several hundred, where "Ventube" has been selected as the most efficient and economical means of ventilation. If you've a job on which you're bidding that calls for tunnel work, we'll be happy to submit estimates and technical help. Feel free to write for any information.

*"Ventube" is Du Pont's registered trademark for its rubber impregnated flexible ventilating duct.



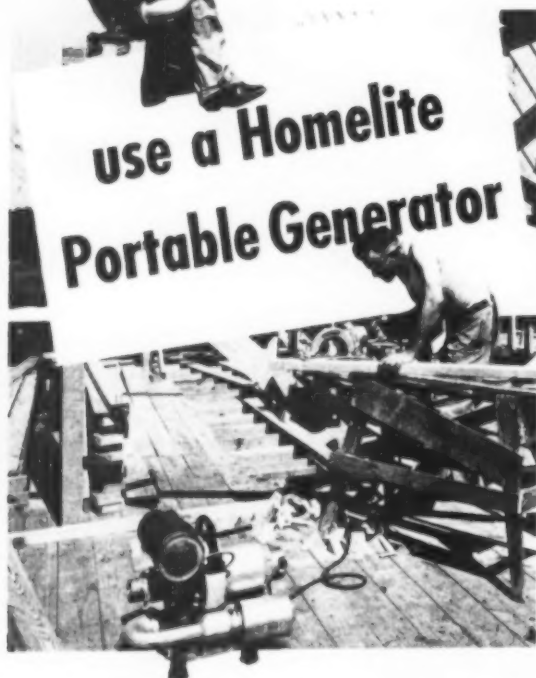
E. I. DU PONT DE NEMOURS & CO. (INC.)

"FABRIKOID" DIVISION... FAIRFIELD, CONNECTICUT

THE FLEXIBLE VENTILATING DUCT

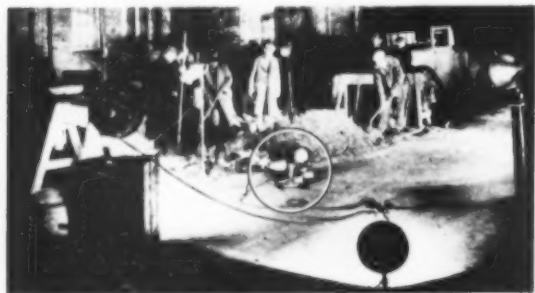
*To make a
Long Job
Short—*

**use a Homelite
Portable Generator**



FOR OPERATING ELECTRIC TOOLS

A Homelite Portable Generator is a three-way time saver. Its 1800 watt out-put at 110 volts supplies enough current to operate several electric tools—power tools that change long hard tasks into quick easy jobs. Also, a Homelite eliminates the time lost and red tape in having power installed. And furthermore, being easily portable by one man, a Homelite is quickly set-up for operation without long cable connections.



FOR FLOODLIGHTING NIGHT WORK

On night work, also, a Homelite Generator makes long jobs short. Brilliant floodlights—in addition to electric tools—can be operated by this 83 pound generator—floodlights that help men work with safety and day-time efficiency. Operated by a built-in gasoline engine, a Homelite needs no manual attention. Complete unit is built for rugged service in all kinds of weather.

Send for illustrated bulletin



HOMELITE

CORPORATION

1808 Riverdale Avenue, Port Chester, N. Y.

(Continued from page 106)

vacuum is to draw out any air that collects and so to maintain a constant priming of the pump and to insure uniformity of suction, regardless of the varying proportion of air and water. These pump units are rated at 2,000 g.p.m. under a 30-ft. head or 1,200 g.p.m. against a 60-ft. head. This latter head is about the delivery requirement on the San Diego job.

In connection between each riser and the header, a stop-cock is used to permit of regulating the action in the well point. One inspector is constantly making the rounds on each header line, feeling every connection by grasping it for a few seconds with his hand. The temperature of the pipe and vibration, if any, indicate to the experienced inspector what amounts of water and air are being withdrawn. The stop-cock is always adjusted to give as much capacity as is needed to take all the water that can be drawn out, but not to be wasteful of the vacuum (which withdraws air) where little or no water is coming in. Temperature can be used as a guide because the water is colder than outside air temperature and the pipe temperature goes down in proportion to the quantity of flow carried.

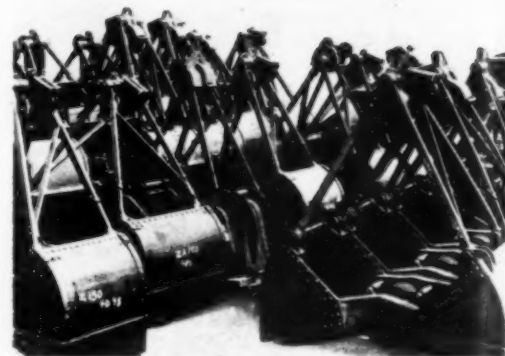
Volume of Pumpage

With the excavation well along toward completion on June 10, a constant flow through the well points was being maintained at the rate of about 2 m.g.d. This was expected to increase with the addition of more well points, particularly the third stage which will be required only in a portion of the total area where excavation is to go below the level of the main drydock bottom. The main floor of the dock, under the concrete, will be at El. —45. Pump well and conduits will extend below this level and one small sump area will go down to El. —61. Excavation to all these subgrades is to be made with the aid of well points as in the other parts of the work.

Excavation of the 400,000 cu.yd. in the drydock was made with LeTourneau carryall scrapers and Caterpillar RD8 tractors. A dike was built in San Diego Bay around the outer end of the drydock, and water behind this dike will later be pumped out to permit of excavating this outer end of the job in the dry.

Direction

The work is being done under a cost-plus-fixed-fee contract negotiated by Rear Admiral Ben Moreell, C.E.C., chief, Bureau of Yards and Docks, contracting officer representing the Secretary of the Navy, with the Pacific Bridge Co. In charge for the Navy are Capt. J. T. Mathews, C.E.C., officer in charge and public works officer, Eleventh Naval District; Lt.-Comdr. Alexander Martin (C.E.C.) resident officer in charge at the site; and Lieut. (j.g.) J. J. Albers (C.E.C.) assistant officer in charge. J. W. Bournier is civilian chief engineer for the Navy. W. G. Swigert is president of the Pacific Bridge Co.; T. M. Kuss is chief engineer and Ralph T. Keenan is project manager on the drydock.



BUCKETS READY FOR IMMEDIATE DELIVERY

Speed up your material handling with a new Industrial Brownhoist clamshell bucket. All standard types ready for immediate shipment (photo shows a small part of our large stock). Quantity production plus our manufacturer-direct-to-you sales policy lowers your bucket investment. Write today.

INDUSTRIAL BROWNHOIST

DAY CITY, MICHIGAN • DISTRICT OFFICES: NEW YORK, PHILADELPHIA, PITTSBURGH, CLEVELAND, CHICAGO

ARMSTRONG Reversible Construction RATCHET WRENCHES



Among big ratchet wrenches for bridge, structural and erecting work the ARMSTRONG Ratchet stands alone with its drop forged, heat treated steel handle, its instantly reversible ratchet and hollow center sockets, that are machined from solid steel. Here are the strongest, longest wearing ratchets made—there is not a casting used, and all moving parts are hardened. They are cadmium plated.

Open spindle and socket permit long bolts to pass thru wrench so nuts can be run any distance on thread, and can be quickly and securely set.

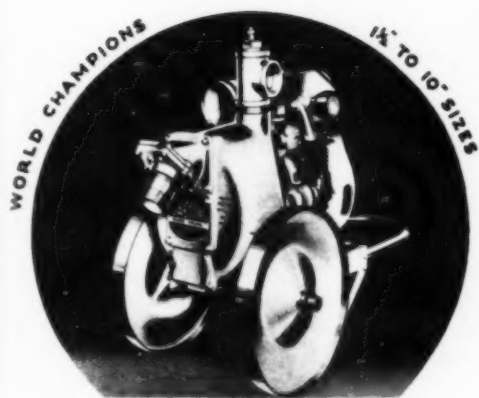
24" Ratchet takes 1" to 2 3/16" Sockets (13 sizes)

36" Ratchet takes 1 1/2" to 3 1/8" Sockets (11 sizes)

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ARMSTRONG BROS. TOOL CO.

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Only JAEGER Pumps Have All These Features

- **JAEGER PRIMING JET** — Up to 5 times faster prime and re-prime — no adjustments, no need to "gun" engine.
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- **EVERY PUMP FACTORY-TESTED** for high capacity and pressure.
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GATKE HI-POWER SWING FRICTIONS for TOUGH SERVICE



The new GATKE HI-POWER Frictions will save you plenty on TOUGH jobs.

They have power for swinging heavy loads—guts to stand the heat and hold—long wear life that you must experience to believe.

Whatever your service, we have what it takes to do the job and will guarantee results. Just tell us what you need.



ASBESTOS PRODUCTS

**FRICTIONS - BRAKE LININGS
CLUTCH FACINGS - FABRIC BEARINGS**

GATKE CORPORATION, 226 N. La Salle St., Chicago



Precast Concrete Houses

(Continued from page 65)

At the suggestion of motion picture companies, and with Army representatives present, an effort was made to simulate a conflagration in order to test the fire resistance of the structure. The fire was severe enough to drive the cameramen out of range. After the walls had been washed it was found that the concrete units were not checked and that the only damage sustained was a warped steel window sash.

Patents to the Hayes System, under which this all-precast all-concrete house is constructed, are owned by Hayes Econo-Crete Corporation, Los Angeles, Calif.

★ ★ ★

Well Points PREDRAIN SEWER EXCAVATION

(Continued from page 50)

the camp. The second, larger station pumps the sewage through a 10-in. cast-iron force main 3,960 ft. long to a treatment plant near an existing drainage canal. During the brief period while the treatment plant was under construction, raw sewage from the camp was delivered directly into the drainage canal.

After the vitrified clay sewers had been laid, the two 8-in. centrifugal pumps and portions of the well-point system were set up at the sites of the two pumping stations to prepare the soil for excavation and construction. At station No. 1 an installation of 60 well points in 13 days lowered the water level 13 ft. to allow leveling of the bottom of the dry excavation and erection of forms and reinforcing steel for the bottom mat of the pump pit. On the thirteenth day of pumping, the well-point system was delivering about 50,000 g.p.h., a low rate of pumpage for a 13-ft. drawdown in this part of Florida. To predrain the larger and deeper excavation for pumping station No. 2, an 8-in. centrifugal pump pulled water for three weeks from an installation of 80 well points. In this time the water level dropped almost 17 ft., permitting excavation and concreting in the dry for the bottom of the pump well, 16 1/4 ft. below ground surface and almost 15 ft. below water table.

In the porous sand typical of this part of Florida, the contractors employed three types of well points (including perforated screen and spiral, flat-wire slotted types) with equally good results. The points were 1 1/4-in. diameter, 30 in. long, fitted to

(Continued on page 110)



More Work from Explosives

Velocity, strength, and density influence the shattering power of an explosive. Primacord insures high velocity throughout the charge. It carries an extremely powerful detonating wave along its entire length at a speed of 3.9 miles per second. Since this is faster than the rate of propagation in most explosives, the velocity at which the entire charge is detonated is stepped up to the rate of propagation in Primacord. Obviously, the shattering effect of the charge is increased, resulting in more work from your explosives when Primacord-Bickford Detonating Fuse is used. Send for the Primacord booklet.



1. Tie through cartridge.



2. Half hitch branch to main line.



3. Connect main line lengths with square knot.



4. Fuse and cap on end of main line.

IMPORTANT

Branch lines should lead away from main lines at right angles. Avoid kinks and small loops.

PRIMACORD BICKFORD Detonating Fuse

PB-35

THE ENSIGN-BICKFORD CO.
Simsbury, Conn.

Makers of Cordeau-Bickford Detonating Fuse—and Safety Fuse since 1836

IT'S GOT 'EM ALL LICKED FOR DIGGING POWER

A BIG CONTRACTOR REPORTS:

"When it comes to excavating work, our Williams Bucket surely digs. We don't believe better buckets are built."

You'll say so too, once you use a Williams Bucket.

Williams Buckets and Parts are carried by distributors in all parts of the country. Bulletins covering Williams Power Arm, Multiple Rope, and Dragline Buckets sent on request.

THE WELLMAN ENGINEERING CO.

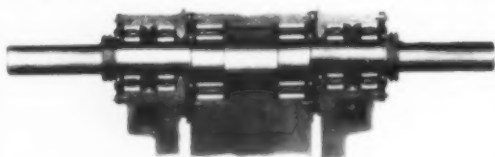
7017 Central Avenue

Cleveland, Ohio

WILLIAMS *Buckets*

built by WELLMAN

HOW SOUNDER ENGINEERING MAKES UNIVERSAL CRUSHERS a Better Buy!



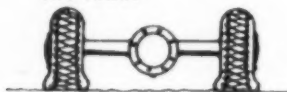
Almost any machine shop could build a crusher that would work. But it takes years of experience, field study and—most important of all—sound engineering to produce a crusher that will not only work, but *do the most work with fewer replacements and give the longest possible service life—the Universal Crusher.*

For example, take the bearing arrangement on Universal Crushers—two large roller bearings on each side of the frame, instead of the customary single bearing, and two roller bearings on the pitman. Splits the load and shock stress four ways instead of two. That's why they put dual tires on trucks—splits up the load—four tires carry the weight of only two; easier on the tires, easier on the roads. Same with Universal's bearing arrangement—easier on the bearings—easier on the crusher.

This bearing detail is typical of the sound engineering throughout every Universal Crusher and Crushing Plant—no excess weight, greater capacity, less power consumed, minimized maintenance. Analyze the engineering design—check their performance and you'll pick Universals every time!



Dual Bearings—Like dual tires—Split the load!



Whether it's a stationary or portable plant Universal Crushers give you maximum performance.

UNIVERSAL CRUSHER COMPANY, 327 8th St. West, Cedar Rapids, Iowa.

UNIVERSAL

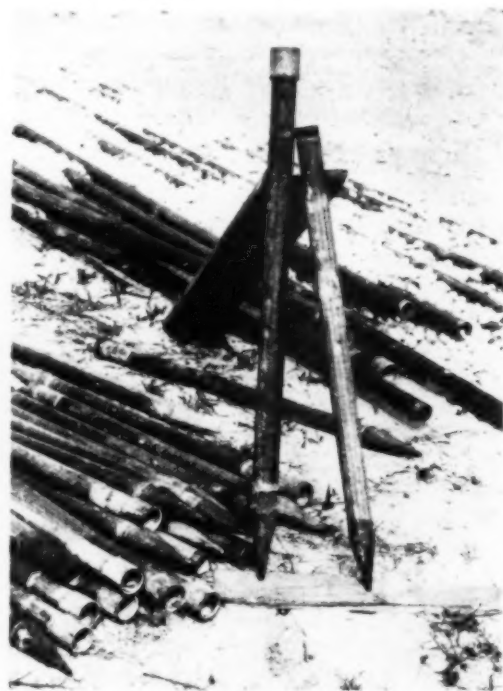
CRUSHERS, PULVERIZERS, COMPLETE PLANTS, SPREADERROLLERS, PORTABLE ASPHALT PLANTS

(Continued from page 109)

pipes of the required length for various depths of excavation. Both factory-made and contractor-fabricated header pipes were used with the well points; the header lines were equipped with Walworth valves.

Water Supply

To distribute water from an independent supply developed at the site, the contractors laid 3.6 mi. of Transite asbestos-cement mains, 6 to 12 in. in diameter. As these mains were laid close to the surface of the ground, at about the level of the water table, no deep excavation or predraining of trenches was required. Water main crews accordingly made faster progress than sewer crews; in one 8-hr. day two gangs laid more than 2,000 ft. of the asbestos-cement pipe.



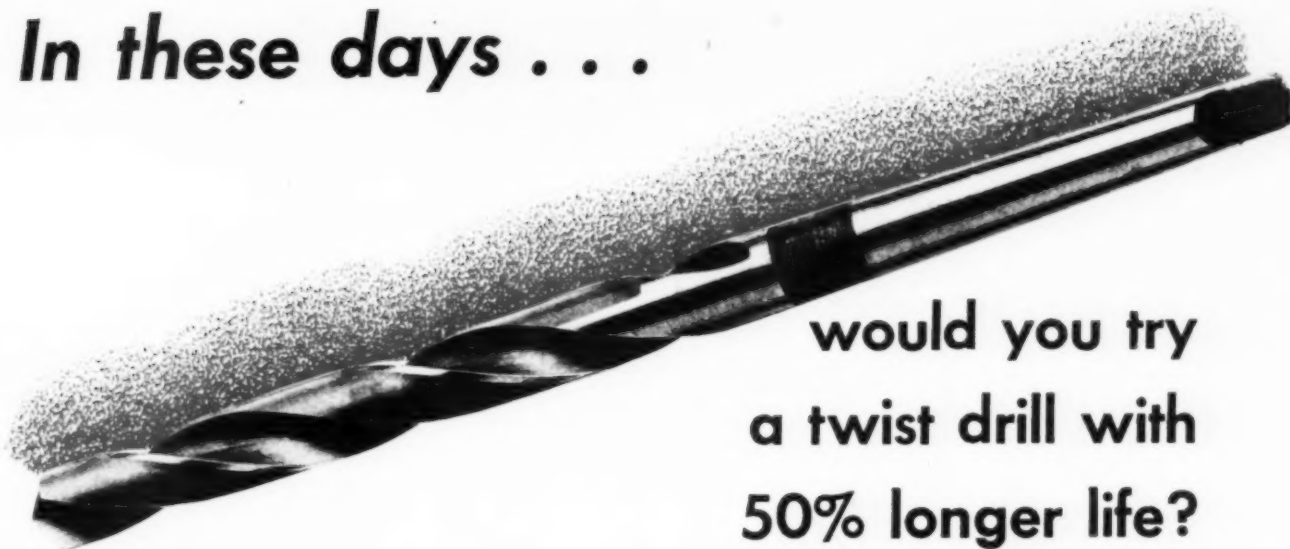
THREE TYPES OF WELL POINTS. Two of which are shown here, serve with equal effectiveness in pre-draining sandy soil at two pumping stations. Of two well points leaning against board, one at left is ordinary perforated screen type, and one at right is spiral flat-wire slotted type.

A water supply for the camp was developed on the site by sinking a 30-in. hole to 140-ft. depth and installing an 18-in. pipe casing with a 20-ft. screen section at the bottom. Gravel packing was placed around the screen section, and the remainder of the hole surrounding the casing was filled with a dense mixture of gravel, sand and clay.

Water requirements are based on an estimated consumption of 300,000 g.p.d., and the well above described was designed to produce a minimum of 500 g.p.m. Actual flow from the well is almost double the minimum requirement. Because the water is hard, containing a high proportion of mineral salts (about 390 parts per million), it is passed through sand filters and is treated before delivery to a 65,000-gal. clear well from which it is raised by a 750-g.p.m. pump to a 200,000-gal. elevated tank mounted 125 ft.

(Continued on page 112)

In these days . . .



would you try
a twist drill with
50% longer life?

Surely in these critical days you would try a different drill if you could be sure it would last 25% or even 10% longer. And you would apply the same logic to wire rope if you knew that there is really a difference in ropes. There is, and the name of the rope to ask for is



HAZARD LAY-SET *Preformed*

In comparison with non-preformed ropes, LAY-SET Preformed often makes astonishing records.

In the first place, it *lasts longer* because of its extreme resistance to fatigue. That eliminates frequent shutdowns for replacement, thus saving priceless time. This means faster and more consistent production.

In the second place, it is *easier and safer for workmen* to handle. It is disinclined to kink. It's relaxed and tractable like a well-trained saddle horse as compared with a bucking bronco.

These characteristics are preformed into LAY-SET Wire Rope at the mill, and they account for its ability to withstand hard work for a longer time at a lower cost—and with greater safety to men and equipment.

See for yourself by ordering Hazard LAY-SET Preformed Green Strand and keeping a comparative record of its performance. All Hazard ropes identified by the Green Strand are made of Improved Plow Steel.

HAZARD WIRE ROPE DIVISION • WILKES-BARRE, PENNSYLVANIA

Established 1846

AMERICAN CHAIN & CABLE COMPANY, Inc.

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MICHIGAN mobile CRANES

Get things done FAST!

Rapid expansion of factories, shipyards, arsenals, cantonments demands use of high-speed construction machines and methods. Steel erection, and other work, progresses swiftly when MICHIGAN Mobile CRANES are on the job! They get around faster than ordinary, less mobile units. Ten large pneumatic tires provide utmost stability and truck mobility, even on soft ground. Time-proven AIR CONTROLS, plus ample power of heavy duty motors, permit operators to safely handle heavy loads with speed and precision, even in cramped quarters! Designed and built all the way through for long hours of uninterrupted hard work, MICHIGAN Mobile CRANES get things done FAST—ON SCHEDULE—and at a profit to owners.

To get the complete story of why MICHIGAN Mobile CRANES (convertible to all the standard attachments) are setting new production records, write for MICHIGAN'S WORK BOOK, CM-15.

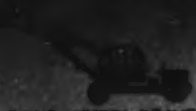
3/8YD
1/2YD



DUAL TANDUM DRIVE



SINGLE AXLE DRIVE



FOUR-WHEEL DRIVE



CRAWLER



"Rigged as Shovel, Dragline or Trench Hoe, MICHIGAN'S 'fast-paced production' will earn real profits for you from a broad range of work!"

MICHIGAN

America's Mobile Shovel-Crane Specialists

MICHIGAN POWER SHOVEL CO.

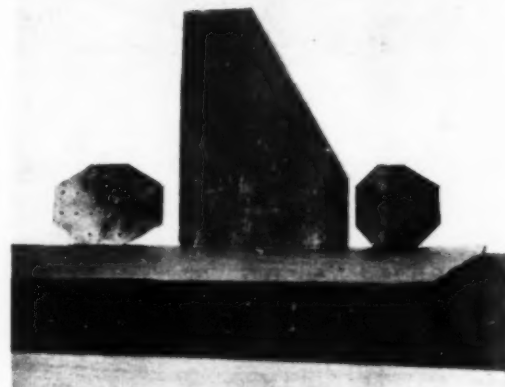
BENTON HARBOR MICHIGAN

(Continued from page 110)

above the main feeder line to the distribution system.

For fire protection during construction of the camp, a 6-in. test well about 130 ft. deep was able to supply 300 g.p.m., and a pumped 6-in. well operated by the contractors was good for 200 g.p.m. Combined production of the two wells was sufficient to supply two hose streams in case of fire.

Plans called for streets and roads more than 3.6 mi. in length to serve the camp. Pavements for all these trafficways consist of native Florida limerock base dis-



HURRICANE BRACES of rustless metal, provided with holes to take 8-penny nails, are selected after erection of buildings to reinforce wood frames against racking by high winds, particularly at connections of wall studs to sills.

tributed to 8-in. loose depth and compacted by heavy flat rollers to 6-in. thickness. The surface of the limerock base is protected by a double surface treatment of asphalt and chips, use of either pea limestone or slag being permitted.

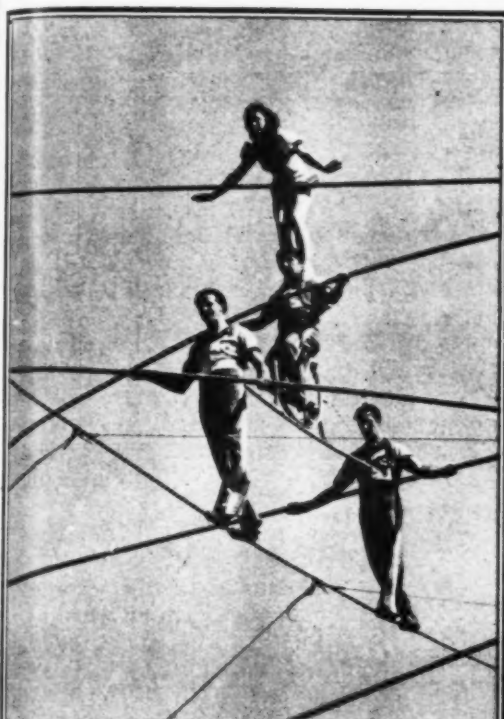
Buildings

A total of 114 buildings of standard army type for temporary use (25-year minimum life) required 4,000,000 b.-ft. of lumber. Practically all framing lumber for the buildings was precut by a battery of four 5-hp. electric-motor-driven variable-adjustment woodworking saws.

After floors of buildings had been laid, side walls were prefabricated complete in flat position on the floors and were raised to vertical position in a few minutes by using one man to every stud. The largest walls prefabricated and raised in this way were the two-story units for officers quarters 150 ft. long. Walls for the officers quarters and for the two-story barracks buildings 80 ft. long were framed, sheathed and faced with drop siding in the flat position; the carpenter work prior to raising included attachment of the rain hood over the first story windows.

Progress

A contract for construction of the camp was signed Nov. 8, and work at the site started Nov. 26. The first contingent of 200 troops moved into the cantonment March 15, and the camp was ready for occupancy by the remainder of the 2,200 men assigned to the air field by April



PERFECT BALANCE

The four tight rope walkers shown above, must have perfect balance to successfully perform their breath taking act. Just as their work depends upon this perfect balance so does the work of a shoveler depend upon balance in his shovel. Balance in a shovel means easier handling and more efficiency in shoveling. A new re-designed socket gives to the ABW Solid Shank Shovel a perfect balance. The new high bend has achieved for this famous shovel a balance unequalled in any other solid shank shovel.

New Redesigned Socket



Try This Test

Lay one of these new ABW Solid Shank Shovels on a table or desk, balance with the blade and socket projecting over the edge of the table, and the handle poised free of the table. Then tip the blade down to either side, release and watch the shovel right itself. This is the perfect balance which no other solid shank shovel has.

To users of shovels this is an important development and one that will be welcomed by buyers of shovels. In addition to this exclusive feature ABW Solid Shank Shovels are equipped with the famous Shock Band which gives more handle strength to the shovel. ABW Solid Shank Shovels are made from one solid bar of steel.

Ask your Jobber



AMES BALDWIN WYOMING CO.

PARKERSBURG, W. VA.

NORTH EASTON, MASS.

ABW PRODUCTS

Shovels	Rakes
Spades	Post Hole
Scoops	Diggers
Forks	Agricultural
Hoes	Handles

15. Completion of the entire contract was expected by July 1.

Delivery times for various steel items required on the project were as follows. elevated water tank, 105 days; hangar structural steel, 90 days; hangar doors, 120 days; hot water tanks, 8 to 12 weeks.

Employment

To avoid payment of time-and-one-half rates to skilled labor for overtime work, the project was carried through on a 40-hr. week basis, employing one shift. The payroll peak included 1,735 men.

Administration

Since Dec. 23, 1940, construction at the West Palm Beach Air Field has been under the direction of the Corps of Engineers, U. S. Army, with Capt. C. A. Addington as resident engineer in charge at the site. For the construction contractors, Watt & Sinclair of Florida, Inc., Palm Beach, and Cleary Bros. Construction Co., West Palm Beach, P. C. Lissenden is general superintendent on the job. G. R. Solomon has been directing work at the site for Solomon & Keis, engineer-architects, Fort Lauderdale, Fla. and Troy, N. Y.

★ ★ ★

Tower Framing

Supports

Steel Shells

For Concrete Columns

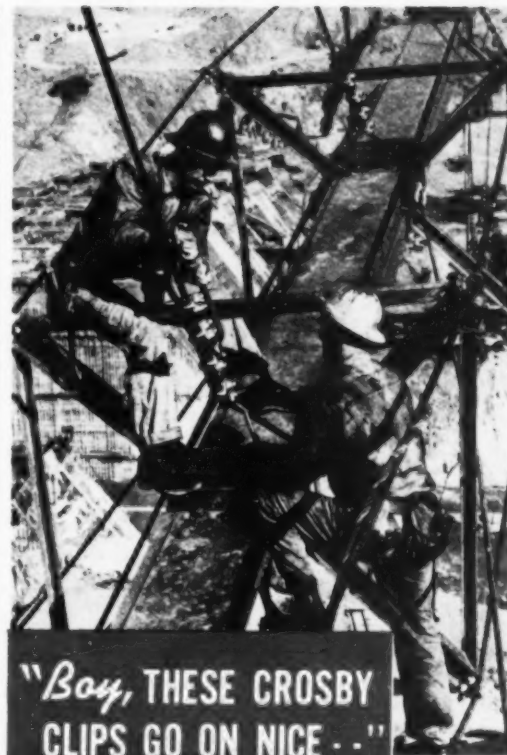
(Continued from page 53)

without any settlement except the anticipated take-up at the joints in the vertical posts of the bents. The forms had been set a little high to allow for this take-up. Concrete was handled in buckets on the 100-ft. boom of the Whirley crane.

General Contract

Construction of the column-supported guard wall was only one feature of a \$4,272,000 contract awarded in April 1939, to the Central Engineering Co. for the navigation lock, the substructure of the power house adjoining the lock on the east and the rolled earthfill dam and earth dike extending west from the lock for 7,860 ft. In September, 1940, the same firm received the contract for the power house superstructure on a low bid of \$370,000. Accompanying photographs show the status of construction on the lock and power house in March of this year. The Central Engineering Co. is now engaged in executing its third contract, awarded

(Continued on page 114)



"Boy, THESE CROSBY CLIPS GO ON NICE . . ."

"Yeh, AND THEY STAY PUT, TOO"

"When it comes to poker I'll bet my shirt, but for fastening wire rope I want Genuine CROSBY CLIPS and nothing else but."

That's the opinion of men who know all about wire rope clips, by actual, first-hand experience. They KNOW that the

Genuine CROSBY CLIP

leads on these four vital counts:

1. Correct Grip.
2. Drop Forged Steel Construction.
3. Perfect Finish.
4. Hot Dip Galvanizing Defies Rust.

And the Red U-Bolt tells you it's Genuine.



Write today for a copy of our important book, WITH AN EYE TO SAFETY.

AMERICAN HOIST & DERRICK CO.

CHICAGO ST. PAUL, MINN. NEW YORK

AMERICAN TERRY DERRICK CO. SOUTH KENNY, N. J.

FAST PAGE TWO-ENGINE DIESEL-POWERED WALKING DRAGLINE



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This new Page Two-Engine Walker is a new development in large draglines . . . It provides FAST HOIST AND FAST SWING—AT THE SAME TIME! Visualize using ALL the power of your present dragline for *hoisting only*, without swinging the machine. Think how that would increase hoisting speed! Now consider a second independent engine for *swinging only* . . . speeding up the

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(Continued from page 113)

on a low bid of \$2,152,000, for concrete slope protection and supplemental concrete work on the East and West dams at Pinopolis.

Administration

Development of the \$41,000,000 Santee-Cooper power and navigation project is the responsibility of the South Carolina Public Service Authority, of which R. M. Cooper is general manager, J. H. Moore is director of engineering, and F. R. Sweeny is engineer. The Harza Engineering Co., Chicago, L. F. Harza, president, is in charge of engineering design and construction. F. A. Dale is engineering manager on the project for this firm.

Construction work on the three contracts of the Central Engineering Co., Davenport, Iowa, is under the direction of A. E. Cossens, general superintendent.

★ ★ ★

WPA BUILDS *Access Roads*

(Continued from page 66)

General Depot. It is a dual type road with two 24-ft. hard surface lanes separated by a 16-ft. parkway. The project cost \$294,000, of which \$236,000 was supplied by WPA.

Expansion of military facilities made development of access roads essential. When new camps were built, roads had to be constructed to serve them, and even at existing camps roadways leading to the reservations had to be enlarged to meet the requirements of heavy motorized vehicles and increased troop concentration.

Highway to Fort Meade

Fort George G. Meade, Maryland, presents an example of the latter type of work. Tens of thousands of trainees and regular army troops are stationed at this reservation, where a year or so ago only a couple of thousand men were encamped. Roads leading to Fort Meade were sufficient for the small garrison but inadequate for the expanded training center.

To provide a better road, the Maryland State Roads Commission initiated and sponsored a project to reconstruct and widen the highway from Westport, near Baltimore, to the port. The entire road was widened to 24 ft., curves were eliminated, the route was strengthened and resurfaced, and new sections were constructed where necessary. WPA supplied the labor. Now the huge training center has a satisfactory road for the hundreds of motorized vehicles that rumble to and from Fort Meade.

Outlet for Unskilled Labor

Because of its capacity to use unskilled and semi-skilled labor, access road building

(Continued on page 117)

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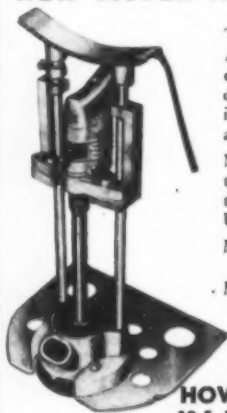
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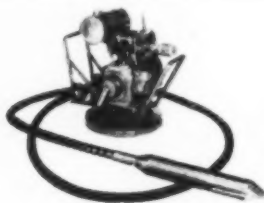
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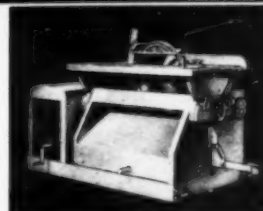
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- Self Priming Pumps
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- Well Point Systems

Departmental Staff

CONSTRUCTION METHODS

New York City

(Continued from page 114)

as distinct from major highway construction is particularly well adapted to the WPA program. Also the WPA, by reason of its flexible organization, is able to initiate defense road projects with a minimum of lost time. As quickly as the needs can be determined and plans and specifications approved by the Army and Navy officials, the WPA starts work on urgently needed roads to forts, posts, camps, training centers and plants manufacturing for defense.

In all, more than 10,000 WPA workmen are engaged in access road construction. In many instances, WPA has authorized extra shifts which permit the building of vitally needed roads to go forward 24 hr. a day, seven days a week. The types of road building range from temporary graveled roads, necessary to expedite camp construction, to four-lane concrete highways and heavy bridges to fill more permanent needs. An example of the heavier construction is the four-lane concrete highway from Jacksonville, Fla., providing access to both the Naval Air Station and Camp Blanding. The highway bypasses dense traffic zones to cross the Ortega River.

Representative Jobs

Another four-lane access road is being built between Fayetteville, N. C., and Fort Bragg. The existing roadway between the town and the fort was entirely inadequate for the needs of the greatly expanded force in training at this center. In South Carolina, WPA workmen are building an access road to the naval ammunition depot in Berkeley County.

Construction of 120 mi. of access roads in Louisiana is now under way in the Camp Beauregard area near Alexandria. This area includes Camps Claiborne, Livingston and Polk, where 75,000 men will be stationed when all accommodations have been completed.

Some 200 WPA workers are engaged in another access road construction job between Fort Barrancas and Warrenton, Fla., near Pensacola. This road, as most of the others, has been certified by the Secretary of War as important to national defense. Another access road will link Tampa and the Army air base at MacDill Field.

At Camp Bowie, near Brownwood, Texas, the WPA is building a traffic artery affording access to the training center. Additional access road work in Texas is being carried on at Camp Wallace, between Port Lavaca and Indianola, in Galveston County, and at the Fort Worth bomber assembly plant and other points.

Industrial Access Roads

A number of Southern industrial plants were included in the list designated by the War Department for WPA access road construction. Among them are the Alabama Ordnance Works at Childersburg, Ala.; the Coosa Ordnance Plant in the same town; the Fairchild Aircraft Plant at Hagerstown, Md.; the Ohio River Ordnance Works at Henderson, Ky.; the Glenn L. Martin Airplane Co. at Baltimore, Md.; the New River Ordnance Plant at Dublin, Va.; and the Radford Ordnance Works at Radford, Va.

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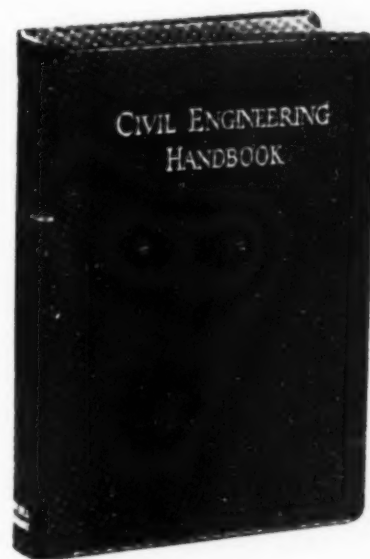
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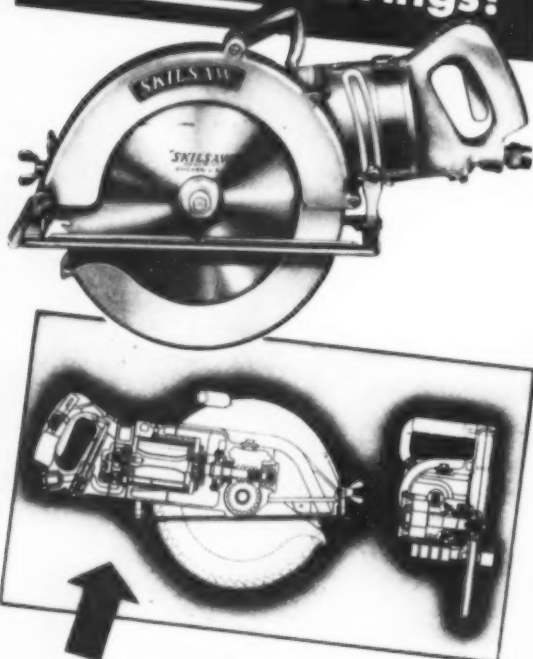
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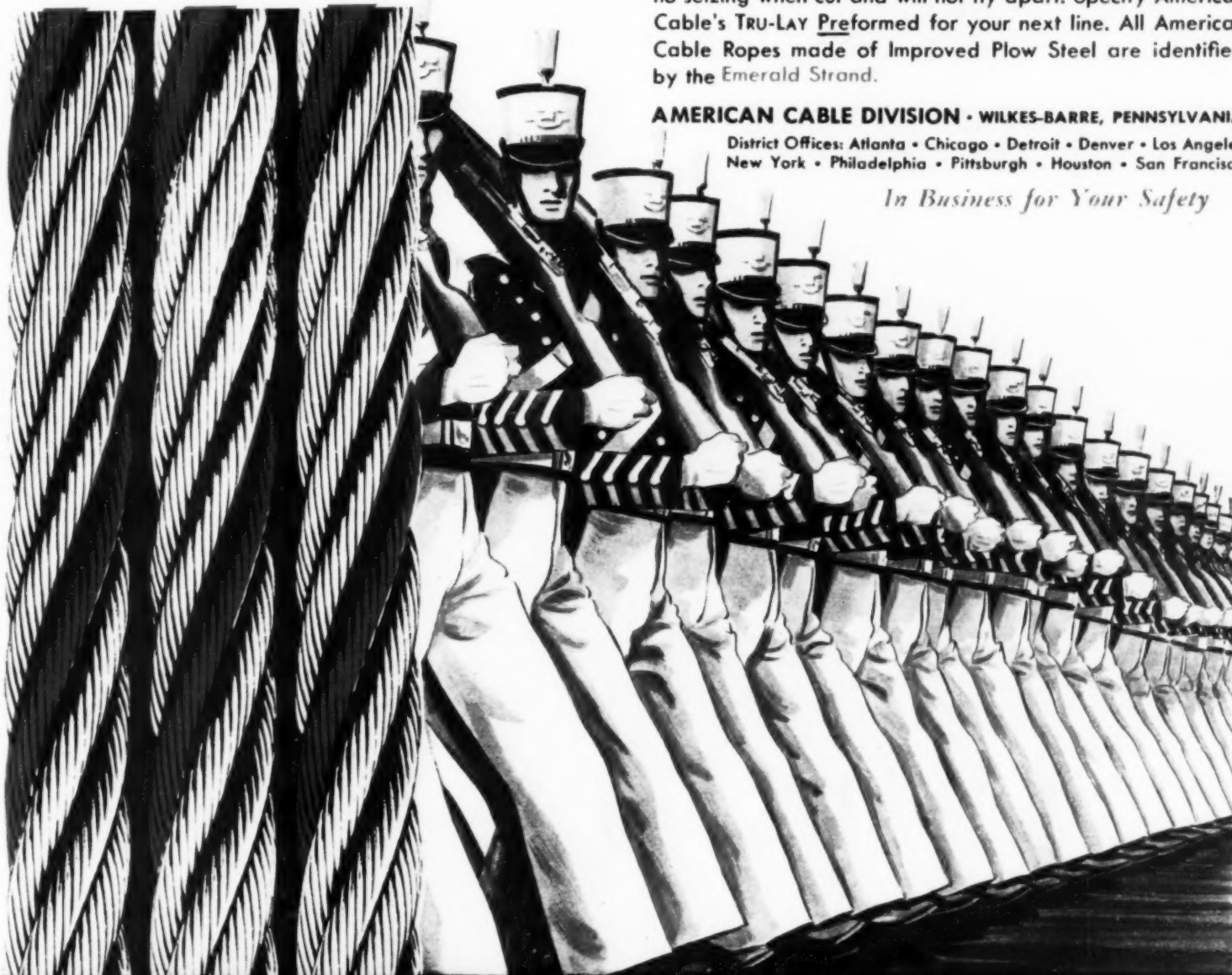
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